

## INSTALLING AND CONFIGURING SIMULATE ONTAP 8.2

The NetApp® Simulate ONTAP® 8 software is a virtual simulator (vsim) of the Data ONTAP® 8 operating system software. Simulate ONTAP 8 software can be used to experiment with, learn about, and explore the operation of the NetApp Data ONTAP operating system.

This guide provides step-by-step instructions to install the VMware® Player™ software for Microsoft® Windows® operating systems and load and configure the Simulate ONTAP 8 software.

**NOTE:** Although this guide shows VMware Player, it has also helped those using VMware Workstation™ and VMware Fusion™ (with slight modifications). Refer to the “*Simulate ONTAP 8.2 Installation and Setup Guide*,” on the Simulate ONTAP 8 software download page, if you are not using VMware Player.

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](#): Manage the cluster using the CLI
- [Task 08](#): Manage the cluster using OnCommand System Manager 3.0
- [Task 09](#): Shut down the cluster properly
- [Task 10](#): Restart the cluster
- [Appendix](#): Licenses

## TASK 1: CHANGE THE SYSTEM BIOS SETTINGS

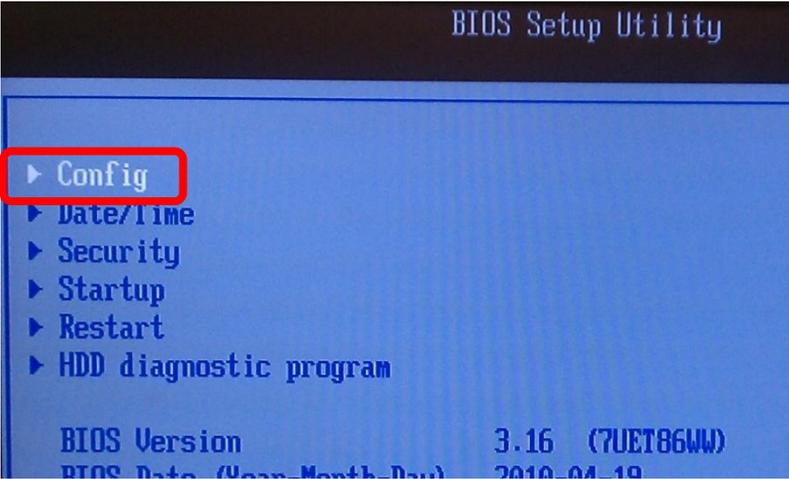
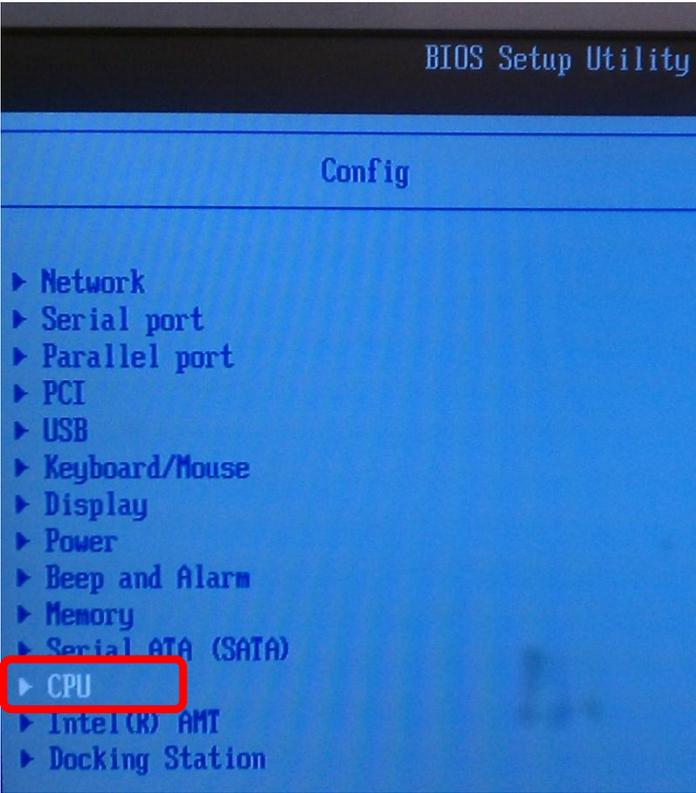
In this task, the goal is to turn on the Intel® Virtualization Technology (VT) features to enable VMware Player to access your 64-bit CPU directly.

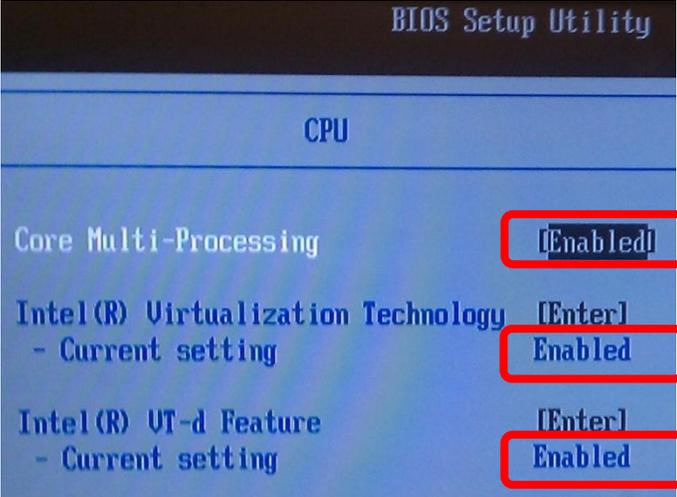
**NOTE:** If your system does not have the appropriate settings, you may not be able to run the simulator on your system.

Before you begin the task, consider the following points:

- The BIOS settings must be changed only once. If they have already been changed, you can skip this task.
- Because the BIOS changes require a complete shutdown (not just a restart), you may want to print this task before you perform it.
- You must change the BIOS settings because the Simulate ONTAP 8 software is 64-bit. The changes allow VMware Player to access the 64-bit processor on your system directly.

STEP	ACTION
1.	Identify the cautions that apply to you, and seek assistance as needed: <ul style="list-style-type: none"><li>• It can be dangerous to the stability of your computer to change your system's BIOS settings. If you are not confident that you can change the settings, consult someone who is more experienced.</li><li>• Change only the BIOS settings that are specified in this task. Do not change any other setting.</li><li>• 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.</li><li>• 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 documentation.</li><li>• These steps change low-level hardware settings, and you must power off and power on your system completely. Do not use the Restart option.</li></ul>
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 <b>F1</b> to enter the BIOS Setup Utility.

STEP	ACTION
4.	<p>Use the direction keys on your keyboard, to select <b>Config</b>, and then press the <b>Enter</b> key.</p>  <p>The screenshot shows the BIOS Setup Utility main menu. The title 'BIOS Setup Utility' is at the top. The menu items are: ▶ Config (highlighted with a red box), ▶ Date/Time, ▶ Security, ▶ Startup, ▶ Restart, and ▶ HDD diagnostic program. At the bottom, it displays 'BIOS Version 3.16 (7UET86WW)' and 'BIOS Date (Year-Month-Day) 2010-04-19'.</p>
5.	<p>In the Config menu, navigate to <b>CPU</b> and then press the <b>Enter</b> key.</p>  <p>The screenshot shows the BIOS Setup Utility Config sub-menu. The title 'BIOS Setup Utility' is at the top, and the sub-menu title 'Config' is below it. The menu items are: ▶ Network, ▶ Serial port, ▶ Parallel port, ▶ PCI, ▶ USB, ▶ Keyboard/Mouse, ▶ Display, ▶ Power, ▶ Beep and Alarm, ▶ Memory, ▶ Serial ATA (SATA), ▶ CPU (highlighted with a red box), ▶ Intel(R) AMT, and ▶ Docking Station.</p>

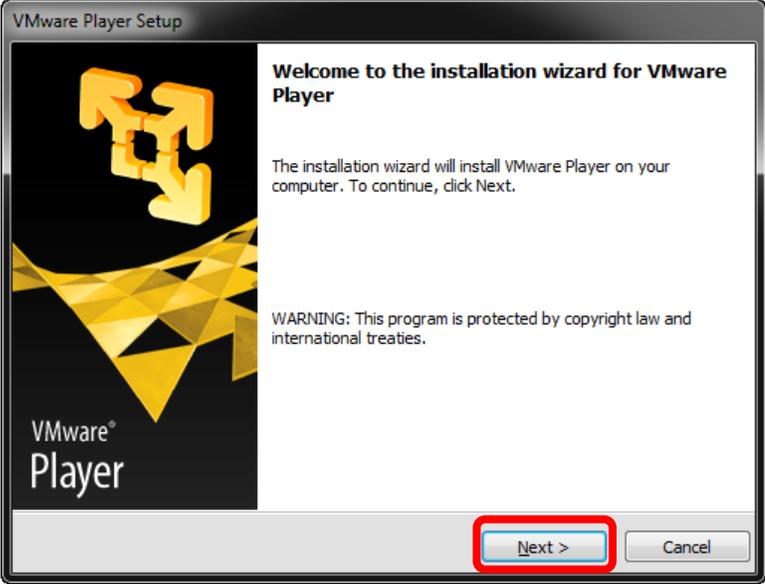
STEP	ACTION
6.	<p>In the CPU menu, perform the following actions as needed:</p> <ul style="list-style-type: none"> <li>• If Core Multi-Processing is not enabled, select <b>Core Multi-Processing</b>, press the <b>Enter</b> key, select <b>Enabled</b>, and press the <b>Enter</b> key again.</li> <li>• If Intel Virtualization Technology (VT) or Intel VT-d Feature is not enabled, highlight the setting that is not enabled, press the <b>Enter</b> key, select <b>Enabled</b>, and press the <b>Enter</b> key again.</li> </ul> <p><b>NOTE:</b> On some models (for example Lenovo T520), the virtualization settings also may be located in the Security&gt;Virtualization menu. Some models and versions of BIOS do not have the VT-d feature. The feature is not required.</p>  <p>The screenshot shows the BIOS Setup Utility interface. At the top, it says "BIOS Setup Utility". Below that, the "CPU" menu is selected. The following settings are listed: "Core Multi-Processing" with a value of "[Enabled]", "Intel(R) Virtualization Technology" with a value of "[Enter] Enabled", and "Intel(R) VT-d Feature" with a value of "[Enter] Enabled". Red boxes highlight the "Enabled" status for each of these three settings.</p>
7.	<p>Save your changes by performing the following actions:</p> <ol style="list-style-type: none"> <li>1. Press the <b>Esc</b> key twice to return to the main setup menu (as shown in Step 4).</li> <li>2. Press the <b>F10</b> function key, and select <b>YES</b>.</li> </ol> <p>Your system restarts.</p>
8.	<p>Wait for the Windows operating system to load completely.</p>
9.	<p>Select <b>Start &gt; Shutdown &gt; Shutdown</b> to shut down your system completely.</p> <p><b>NOTE:</b> The settings that you changed control low-level hardware, so power must be removed from the CPU completely before the virtualization settings can take effect. Do not use the Restart option.</p>
10.	<p>After your system is shut down completely, power on the system.</p>

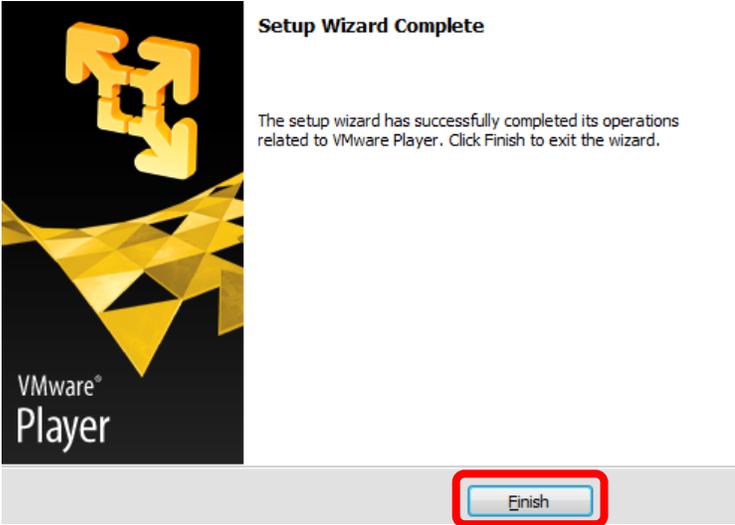
**TASK 2: VERIFY THAT YOUR SYSTEM MEETS SIMULATOR REQUIREMENTS AND DOWNLOAD FILES**

STEP	ACTION						
1.	<p>Ensure that your system meets the following requirements:</p> <ul style="list-style-type: none"> <li>• Dual-core 64-bit Intel® architecture laptop or desktop with VT support</li> <li>• Microsoft Windows XP operating system or greater</li> <li>• VMware Player 4.0.1 or greater or VMware Workstation 8.0.1 or greater</li> <li>• 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)</li> <li>• 40 GB free disk space per instance of the simulator</li> </ul> <p><b>NOTE:</b> The Microsoft Windows XP operating system (32-bit) will only be able to access up to 4GB of system memory. Consider using a 64-bit OS for better performance.</p>						
2.	<p>Navigate to the simulator download site that is provided by NetApp Support (Utility ToolChest): <a href="http://support.netapp.com/NOW/download/tools/simulator/ontap/8.X/">http://support.netapp.com/NOW/download/tools/simulator/ontap/8.X/</a></p>						
3.	<p>Download the Simulate ONTAP 8.2 for VMware Workstation, VMware Player, and VMware Fusion file. Also download the “Simulate ONTAP 8.2 Installation and Setup Guide” as well as the “VSIM Licenses: 8.2 licenses Clustered-ONTAP” text file.</p> <p><b>NOTE:</b> You must have a NetApp Support account to download the files.</p> <table border="1" data-bbox="285 978 1382 1373"> <thead> <tr> <th data-bbox="285 978 493 1016">Simulate ONTAP</th> <th data-bbox="493 978 1094 1016">Download</th> <th data-bbox="1094 978 1382 1016">Documentation</th> </tr> </thead> <tbody> <tr> <td data-bbox="285 1016 493 1373">8.2</td> <td data-bbox="493 1016 1094 1373"> <p>Simulate ONTAP 8.2 for VMware Workstation, VMware Player, and VMware Fusion</p> <ul style="list-style-type: none"> <li>• 7-mode</li> <li>• Clustered-ONTAP</li> </ul> <p>Simulate ONTAP 8.2 for VMware ESX</p> <ul style="list-style-type: none"> <li>• 7-mode</li> <li>• Clustered-ONTAP</li> </ul> <p><a href="#">VSIM Licenses: 8.2 licenses 7-Mode</a></p> <p><a href="#">VSIM Licenses: 8.2 licenses Clustered-ONTAP</a></p> </td> <td data-bbox="1094 1016 1382 1373"> <p><a href="#">Simulate ONTAP 8.2 Installation and Setup Guide</a></p> </td> </tr> </tbody> </table>	Simulate ONTAP	Download	Documentation	8.2	<p>Simulate ONTAP 8.2 for VMware Workstation, VMware Player, and VMware Fusion</p> <ul style="list-style-type: none"> <li>• 7-mode</li> <li>• Clustered-ONTAP</li> </ul> <p>Simulate ONTAP 8.2 for VMware ESX</p> <ul style="list-style-type: none"> <li>• 7-mode</li> <li>• Clustered-ONTAP</li> </ul> <p><a href="#">VSIM Licenses: 8.2 licenses 7-Mode</a></p> <p><a href="#">VSIM Licenses: 8.2 licenses Clustered-ONTAP</a></p>	<p><a href="#">Simulate ONTAP 8.2 Installation and Setup Guide</a></p>
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4.	<p>Navigate to the VMware Player download site: <a href="http://www.vmware.com/go/downloadplayer/">http://www.vmware.com/go/downloadplayer/</a></p>						

STEP	ACTION
5.	<p>Click <b>Download</b> to download the VMware Player for Windows 32-bit and 64-bit package.</p>  <p>The screenshot shows the VMware Player download page. At the top, there is a breadcrumb trail: Home &gt; All Downloads &gt; VMware Player. Below this is a large blue button labeled 'Download VMware Player'. Underneath, there are two dropdown menus for 'Major Version' and 'Minor Version', both set to '5.0 (latest)' and '5.0.2 (latest)' respectively. There are two tabs: 'Product Downloads' (selected) and 'Open Source'. The main content area lists three products:</p> <ul style="list-style-type: none"> <li><b>VMware Player for Linux 32-bit</b> (bundle   210M) with a 'Download' button and a 'Show Details' link.</li> <li><b>VMware Player for Linux 64-bit</b> (bundle   177M) with a 'Download' button and a 'Show Details' link.</li> <li><b>VMware Player for Windows 32-bit and 64-bit</b> (exe   76M) with a 'Download' button and a 'Show Details' link. This 'Download' button is highlighted with a red rectangle.</li> </ul> <p><b>NOTE:</b> VMware Player is free for personal non-commercial use. Please refer to the <a href="#">VMware Player End-User License Agreement (EULA)</a> for using VMware Player according to VMware design and licensing guidelines.</p>

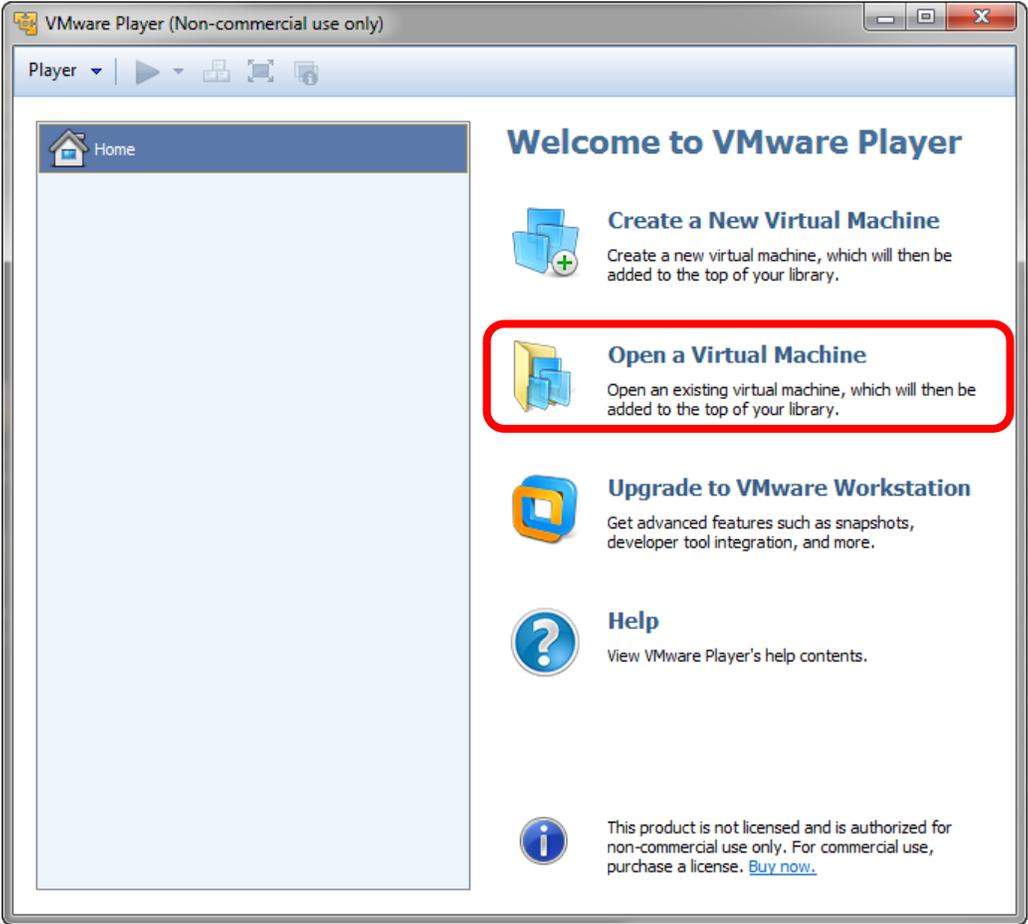
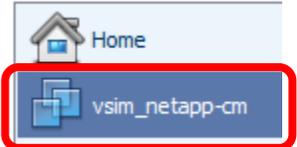
### TASK 3: INSTALL VMWARE PLAYER

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 (for example, VMware-player-5.0.x-xxxxxxx.exe).
3.	If security warning appears, confirm that you want to perform the installation.
4.	<p>On the Welcome screen, click <b>Next</b>.</p> 
5.	Leave the default destination folder as is and click <b>Next</b> .
6.	On the Software Updates screen, ensure that “Check for product updates on startup” is selected and click <b>Next</b> .
7.	On the User Experience Improvement Program screen, the “Help improve VMware Player” can be selected (optional), and click <b>Next</b> .
8.	On the Shortcuts screen, select the shortcut options that you prefer, and click <b>Next</b> .
9.	On the Ready to Perform the Requested Operations screen, click <b>Continue</b> to start the installation.

STEP	ACTION
10.	<p>On the Setup Wizard Complete screen, click <b>Finish</b>.</p> <p><b>NOTE:</b> VMware Player may require a reboot after installation. If so, you will be prompted.</p> 

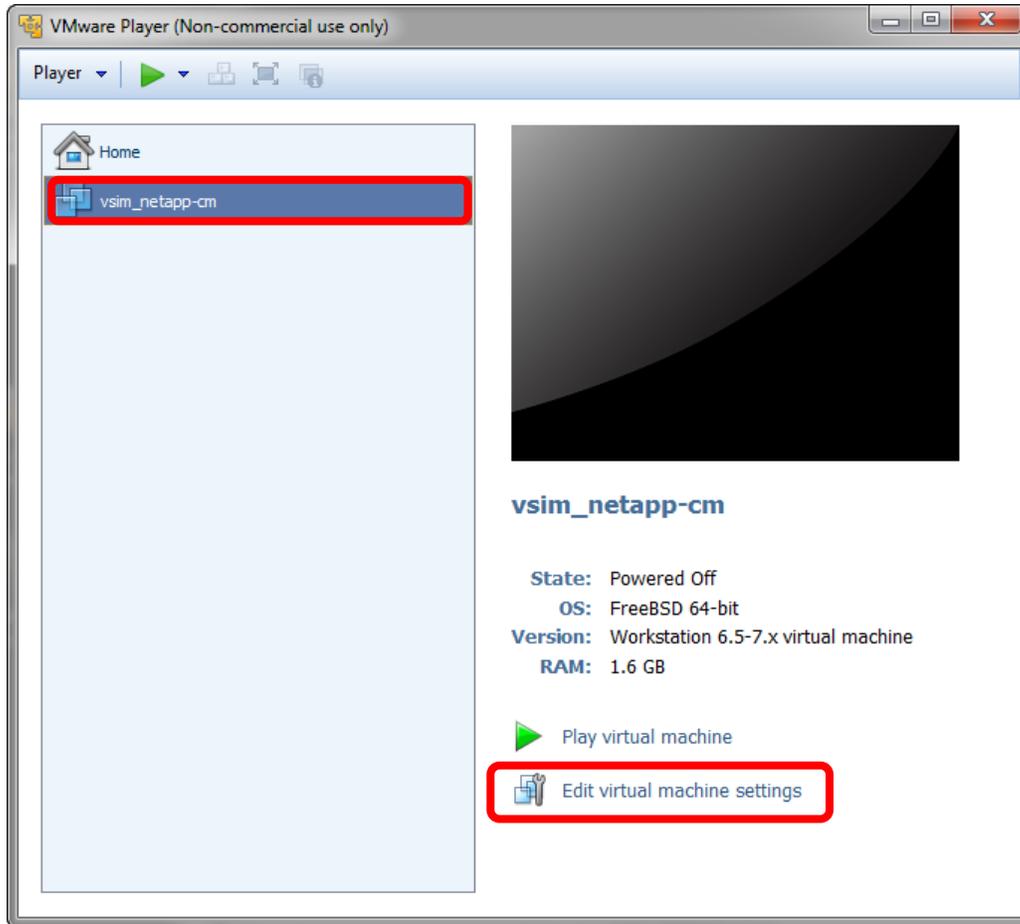
## TASK 4: PREPARE AND OPEN THE SIMULATOR WITH VMWARE PLAYER

STEP	ACTION
1.	<p>On your Windows system, open Windows Explorer, and navigate to <b>Documents</b>.</p> <p><b>NOTE:</b> In some Windows environments, the “Documents” folder may be called “My Documents”.</p>
2.	<p>Create a folder, and name it <b>Virtual Machines</b>.</p> <p><b>NOTE:</b> Some versions of VMware Player create this folder during installation. In some Windows environments, the “Virtual Machines” folder may be called “My Virtual Machines”.</p>
3.	<p>Extract the vsim files into the Virtual Machines folder.</p> <p>You might need an archive extraction tool such as 7-zip, which is a free download:  <a href="http://www.7-zip.org">http://www.7-zip.org</a></p> <p><b>NOTE:</b> The Simulate ONTAP 8.2 file you downloaded from NetApp Support (vsim_netapp-cm.tgz) is a GZIP Compressed Tar Archive file. The TGZ file contains a single 7.57 GB archived file (vsim_netapp-cm.tar) which is a Consolidated Unix Archive file. You will need to extract the TAR file first, before extracting the vsim files. The extracted files will also require about 7.57 GB of hard drive space.</p>
4.	<p>Navigate to the location to which you extracted the files (Documents\Virtual Machines\vsim_netapp-cm), and rename the folder “<b>vsim82-cm-c1n1</b>”.</p> <p>The folder contains all of the files that VMware Player needs to run the simulator and it must be renamed before you load the simulator.</p>
5.	<p>Verify that the folder contains the cfcad and uml directories and the following files:</p> <ul style="list-style-type: none"> <li>• DataONTAP.vmdk</li> <li>• DataONTAP.vmx</li> <li>• DataONTAP-flat.vmdk</li> <li>• DataONTAP-nvram.vmdk</li> <li>• DataONTAP-nvram-flat.vmdk</li> <li>• DataONTAP-s001.vmdk through DataONTAP-s126.vmdk (126 disk files)</li> <li>• DataONTAP-sim.vmdk</li> <li>• DataONTAP-var.vmdk</li> <li>• DataONTAP-var-flat.vmdk</li> <li>• mtoolsrc</li> <li>• nvram</li> </ul>
6.	<p>Start VMware Player (<b>Start&gt;All Programs&gt;VMware&gt;VMware Player</b>) and accept the license agreement. If you are asked about VMware Workstation, chose “Skip this Version” to continue.</p>

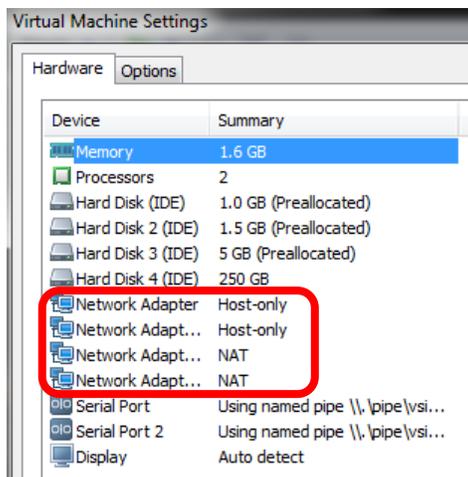
STEP	ACTION
7.	<p>Click <b>Open a Virtual Machine</b>.</p> 
8.	<p>Navigate to <b>Documents\Virtual Machines\vsim82-cm-c1n1\</b>.</p>
9.	<p>Select <b>DataONTAP.vmx</b> and click <b>Open</b>. The VMware Player inventory appears.</p>
10.	<p>In the left pane, select the virtual machine called <b>vsim_netapp-cm</b>.</p> 

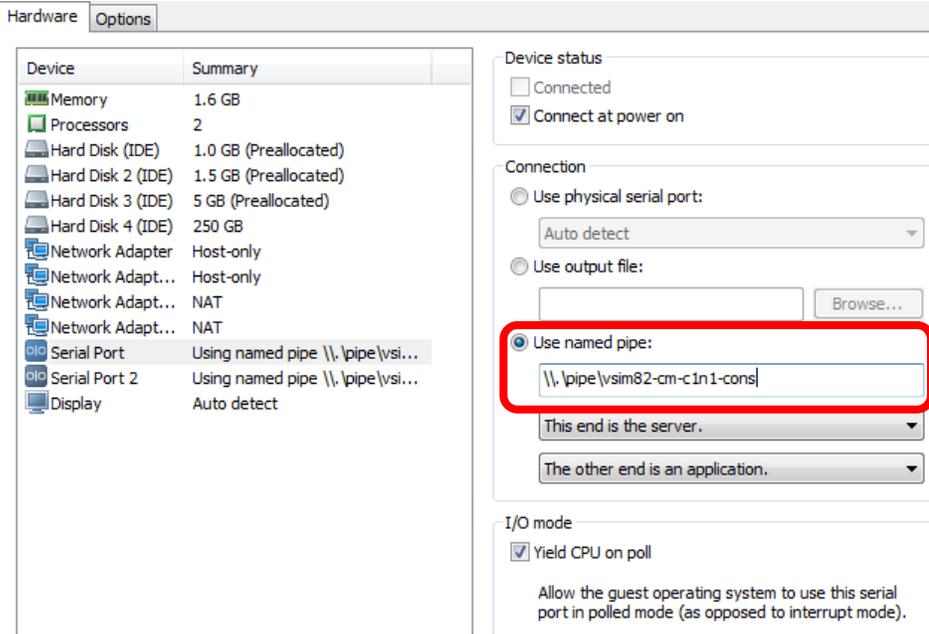
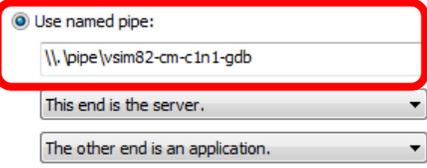
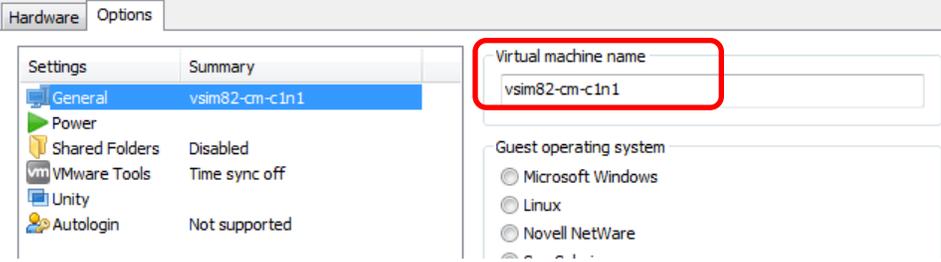
**STEP ACTION**

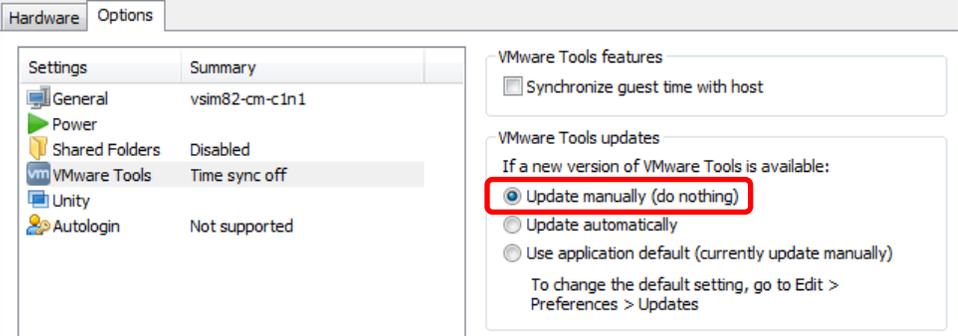
11. Review the information that is displayed in the right pane, and click **Edit virtual machine settings**.  
**NOTE:** Do not play the virtual machine.



12. Click the **Hardware** tab and identify the network adapters.  
Leave these settings at their default values.



STEP	ACTION
13.	<p>On the Hardware tab, select the <b>Serial Port</b> device and rename the “Use named pipe” to <code>\\.\pipe\vsim82-cm-c1n1-cons</code> (Named to identify the simulator folder.)</p>  <p>The screenshot shows the Hardware tab with the 'Options' sub-tab selected. A list of devices is on the left, with 'Serial Port' selected. On the right, the 'Connection' section has 'Use named pipe' selected. The text box for the named pipe contains the path <code>\\.\pipe\vsim82-cm-c1n1-cons</code>, which is highlighted with a red box. Other options like 'Use physical serial port' and 'Use output file' are unselected.</p>
14.	<p>On the Hardware tab, select the <b>Serial Port 2</b> device and rename the “Use named pipe” to <code>\\.\pipe\vsim82-cm-c1n1-gdb</code></p>  <p>This is a close-up of the configuration dialog for 'Serial Port 2'. The 'Use named pipe' radio button is selected, and the text box next to it contains the path <code>\\.\pipe\vsim82-cm-c1n1-gdb</code>, highlighted with a red box. Below the text box are two dropdown menus: 'This end is the server.' and 'The other end is an application.'</p>
15.	<p>Click the <b>Options</b> tab, select <b>General</b> settings, and rename the virtual machine to <code>vsim82-cm-c1n1</code>. Leave the other settings at their default values.</p>  <p>The screenshot shows the Options tab with the 'General' settings selected. The 'Virtual machine name' text box contains the name <code>vsim82-cm-c1n1</code>, which is highlighted with a red box. The 'Guest operating system' section below shows 'Microsoft Windows' selected.</p>

STEP	ACTION
16.	<p>On the <b>Options</b> tab, select <b>VMware Tools</b> settings and select “<b>Update manually (do nothing)</b>”. Make this change because Simulate ONTAP 8.2 software does not require VMware Tools. Leave the other settings at their default values.</p>  <p>The screenshot shows the VMware Workstation Options dialog box for a virtual machine. The 'Options' tab is selected, and the 'VMware Tools' category is chosen in the left-hand list. The 'VMware Tools updates' section on the right contains three radio button options: 'Update manually (do nothing)', 'Update automatically', and 'Use application default (currently update manually)'. The 'Update manually (do nothing)' option is selected and highlighted with a red rectangular box. Below these options, there is a note: 'To change the default setting, go to Edit &gt; Preferences &gt; Updates'.</p>
17.	Click <b>OK</b> 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 that you run the simulator, it must be initialized.

The initialization process requires timely action and total attention:

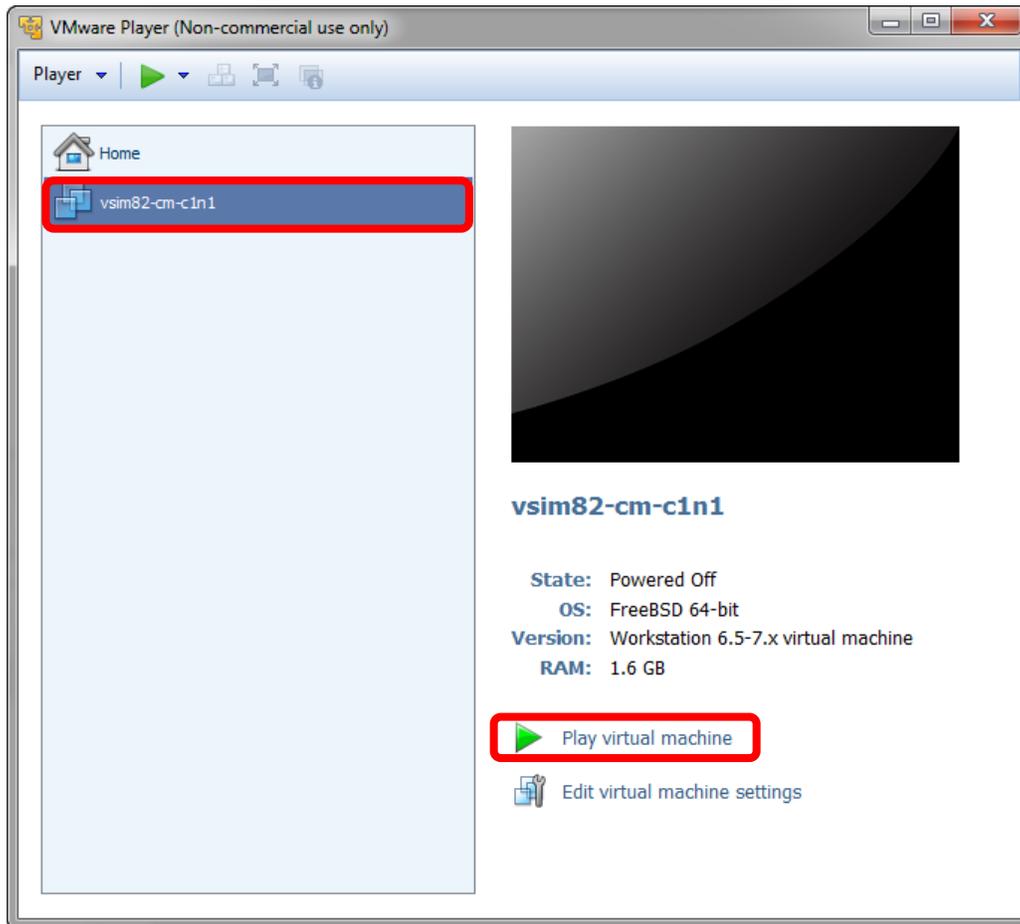
- The initialization menu appears quickly and is displayed briefly.
- Sometimes the boot menu is blocked by a VMware Player message.

**NOTE:** If the initialization steps are not performed properly, the simulator can hang and reboot repeatedly.

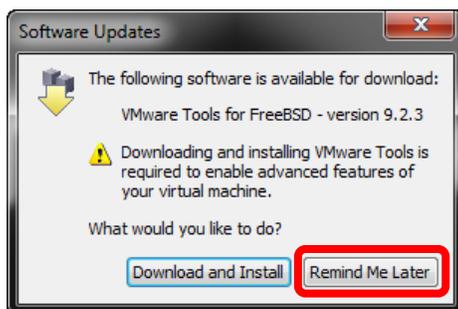
STEP	ACTION
1.	<p>Review the following hints and tips to perform the initialization steps properly.</p> <ul style="list-style-type: none"><li>• To control the machine that is running in the console window, click somewhere in the windows or press Ctrl-G to change mouse and keyboard control to the virtual machine. To return control to the Windows desktop, press Ctrl-Alt.</li><li>• If a Software Updates message prevents access to the boot menu, click Remind Me Later as quickly as possible.</li></ul> <p><b>NOTE:</b> The simulator does not support VMware tools, so the update is not necessary.</p> <ul style="list-style-type: none"><li>• When the Press Ctrl-C for boot menu message appears, press Ctrl-C immediately and wait for the boot menu to appear.</li></ul>
2.	If VMware Player is not running, start it.

**STEP ACTION**

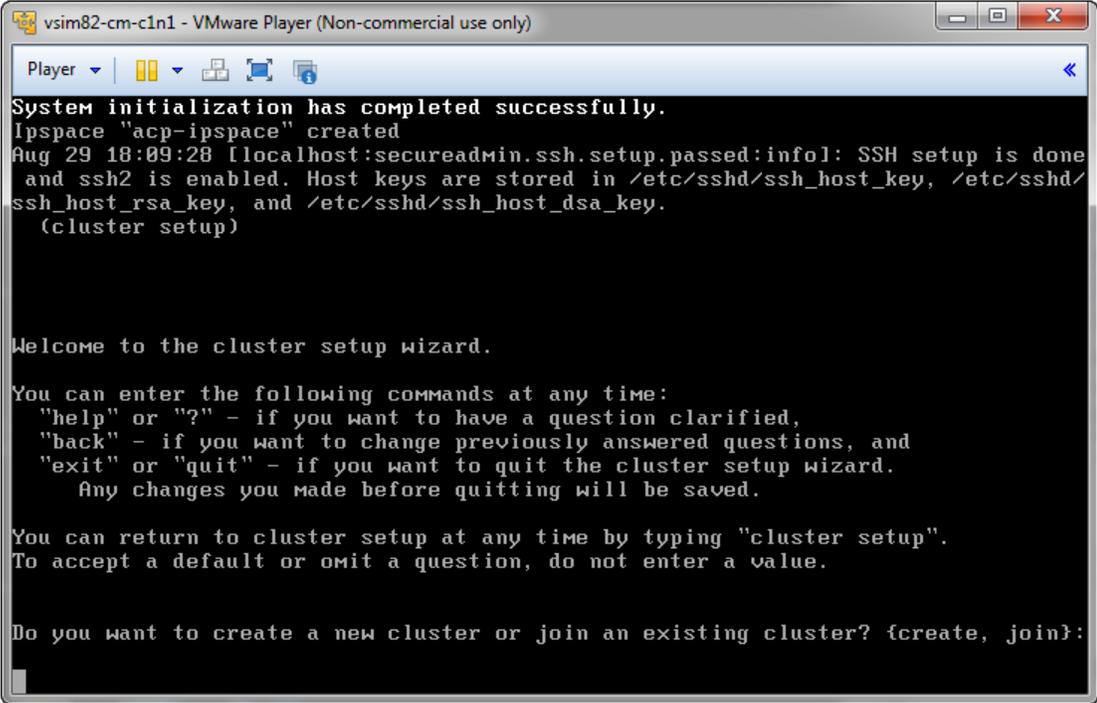
3. Select **vsim82-cm-c1n1**, and click “**Play virtual machine**”.



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.	<p>Click inside the console window or press <b>Ctrl-G</b> and, when the boot menu message appears, press <b>Ctrl-C</b>.</p> <pre data-bbox="284 321 764 583"> NetApp Data ONTAP 8.2 Cluster-Mode Copyright (C) 1992-2013 NetApp. All rights reserved. md1.uzip: 39168 x 16384 blocks md2.uzip: 5760 x 16384 blocks ***** * * Press Ctrl-C for Boot Menu. * ***** ^CBoot Menu will be available. </pre> <p>The “Boot Menu will be available” message is displayed.</p> <p><b>NOTE:</b> If you see disk messages, ignore them.</p>
6.	<p>When the boot menu (a list of numbered options) appears, enter <b>4</b> (for a clean configuration) and press the <b>Enter</b> key.</p> <pre data-bbox="284 800 948 1062"> Please choose one of the following: (1) Normal Boot. (2) Boot without /etc/rc. (3) Change password. (4) Clean configuration and initialize all disks. (5) Maintenance mode boot. (6) Update flash from backup config. (7) Install new software first. (8) Reboot node. Selection (1-8)? 4 </pre> <p><b>NOTE:</b> If you see more messages, ignore them.</p>
7.	<p>At the “Zero disk, reset config and install a new file system?” prompt, enter the letter <b>y</b> and press the <b>Enter</b> key.</p>
8.	<p>At the confirmation prompt, enter the letter <b>y</b> and press the <b>Enter</b> key.</p> <p>The virtual machine restarts automatically and begins the reset process.</p>
9.	<p>Wait until the reset process is completely finished</p> <p><b>NOTE:</b> If you stop the process, you can corrupt the simulator files (simulator disks) and then you must extract them again.</p>

STEP	ACTION
10.	<p>After the virtual machine reset process is complete, the cluster setup wizard starts.</p>  <p><b>NOTE:</b> If you make a mistake during cluster setup, press <b>Ctrl-C</b> to interrupt the wizard. Restart the wizard by re-entering <b>cluster setup</b> at the cluster shell prompt.</p>
11.	<p>At the prompt, enter <b>create</b> to create a new cluster.</p> <pre>Do you want to create a new cluster or join an existing cluster? {create, join}: <b>create</b></pre>
12.	<p>When prompted about using the node as a single node cluster, reply <b>no</b> because this will be a multi-node cluster.</p> <pre>Do you intend for this node to be used as a single node cluster? {yes, no} [no]: <b>no</b></pre>
13.	<p>Enter <b>yes</b> to accept the default values for cluster network configuration.</p> <pre>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. The cluster will be connected using network switches.  Do you want to use these defaults? {yes, no} [yes]: <b>yes</b></pre>

STEP	ACTION
14.	<p>After the cluster interfaces are created, enter a name for your cluster and then press the <b>Enter</b> key.</p> <p>Enter the cluster name: <b>cluster1</b></p>
15.	<p>When you are asked for the cluster base license key, enter the key from licenses that you downloaded in <a href="#">Task 2</a>. You can use lowercase letters for the license key.</p> <p>Enter the cluster base license key: <b>SMKQROWJNQYQSDAAAAAAAAAAAAAAAA</b></p> <p>Creating cluster cluster1</p> <p>Starting cluster support services .....</p> <p>Cluster cluster1 has been created.</p>
16.	<p>Do not add additional license keys at this time but press <b>Enter</b> to continue.</p> <p>Enter an additional license key []:</p>
17.	<p>Create an “admin” password by performing the following tasks:</p> <ol style="list-style-type: none"> <li>If you used the CapsLock to enter the base license key, turn off CapsLock before entering a password.</li> <li>Enter a strong “admin” password (such as Netapp123)</li> <li>Confirm the password by entering the password again</li> <li>Write down your password and <i>do not lose it</i>.</li> </ol> <p>Enter the cluster administrator’s (username “admin”) password:</p> <p>Retype the password:</p>
18.	<p>Retrieve the VMware IP addresses that were created during the VMware Player installation by following these steps:</p> <p><b>NOTE:</b> In a later step, you assign IP addresses to the simulator ports that are within the VMware IP address subnet.</p> <ol style="list-style-type: none"> <li>Press <b>Ctrl+Alt</b> to return to Windows, open a command prompt, and enter <b>ipconfig</b>:</li> </ol> <div data-bbox="282 1360 1383 1730" style="border: 1px solid black; padding: 5px;"> <pre> Ethernet adapter VMware Network Adapter VMnet1:  Connection-specific DNS Suffix  . : Link-local IPv6 Address . . . . . : fe80::c5b2:1286:678e:c531%23 IPv4 Address. . . . . : 192.168.159.1 Subnet Mask . . . . . : 255.255.255.0 Default Gateway . . . . . :  Ethernet adapter VMware Network Adapter VMnet8:  Connection-specific DNS Suffix  . : Link-local IPv6 Address . . . . . : fe80::10de:67cc:eeaa:b5d4%24 IPv4 Address. . . . . : 192.168.176.1 Subnet Mask . . . . . : 255.255.255.0 Default Gateway . . . . . : </pre> </div> <ol style="list-style-type: none"> <li>Record the VMnet8 (NAT) IPv4 Address and Subnet Mask that is displayed in your output.</li> </ol>
19.	<p>Identify the third octet of your system subnet in the VMnet8 IPv4 Address (for example, 176 in the output of step 18). You will use this value to replace <i>x</i> in the following steps.</p>

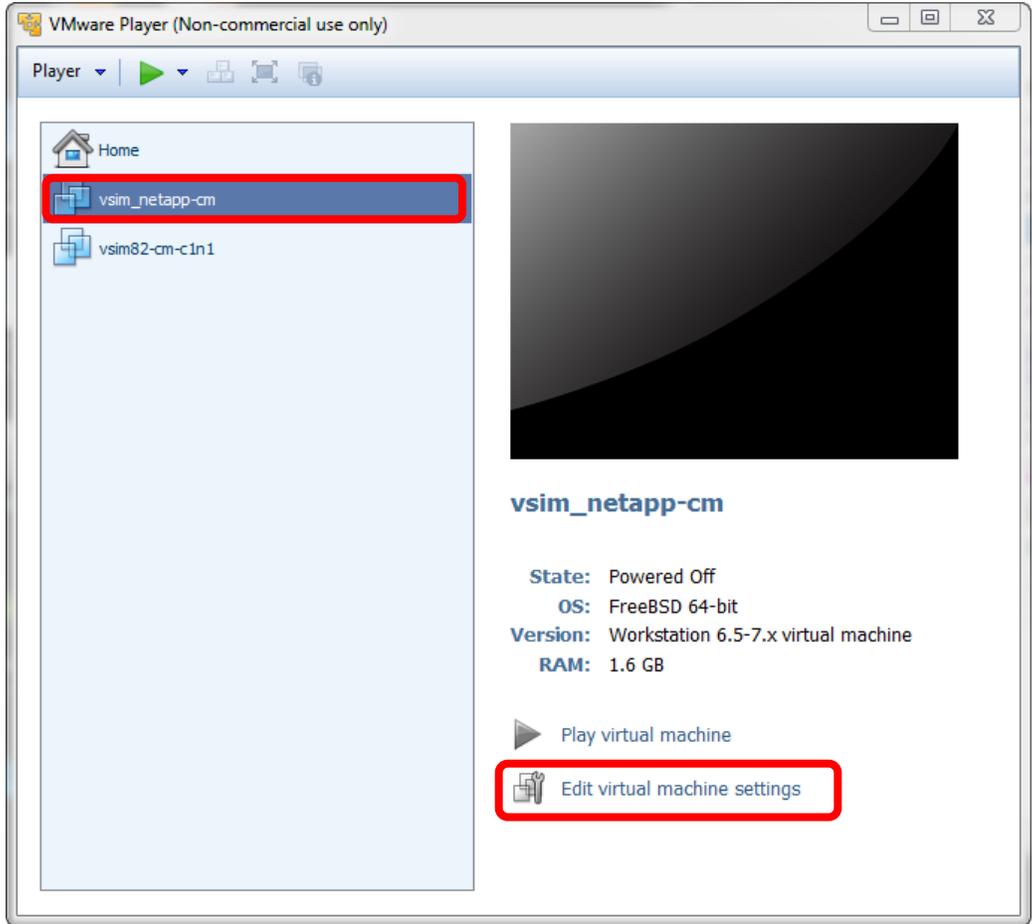
STEP	ACTION
20.	<p>Return to the simulator and enter the cluster management interface values. Replace the <i>x</i> with the value you identified in step 19.</p> <pre> Enter the cluster management interface port [e0c]: e0c Enter the cluster management interface IP address: 192.168.x.101 Enter the cluster management interface netmask: 255.255.255.0 Enter the cluster management interface default gateway: 192.168.x.1  A cluster management interface on port e0c with IP address 192.168.x.101 has been created. You can use this address to connect to and manage the cluster. </pre>
21.	<p>When you are asked for the DNS domain names, press the <b>Enter</b> key.</p> <pre> Enter the DNS domain names: The setup wizard continues with Storage Failover (SFO) information. </pre>
22.	<p>When you are asked for a location of the controller, enter the location (for example, vsim) and press the <b>Enter</b> key.</p> <pre> Where is the controller located []: vsim </pre>
23.	<p>Enter the node management interface values. Replace the <i>x</i> with the value you identified in step 19.</p> <pre> Enter the node management interface port [e0c]: e0c Enter the node management interface IP address: 192.168.x.91 Enter the node management interface netmask: 255.255.255.0 Enter the node management interface default gateway: 192.168.x.1 </pre>
24.	<p>Press the <b>Enter</b> key to leave AutoSupport enabled.</p> <pre> Press enter to continue: ... Exiting the cluster setup wizard. </pre>
25.	<p>Log in to check the status of your new cluster, enter the <b>cluster show</b> command at the console.</p> <pre> login: admin Password: cluster1::&gt; cluster show  Node                Health  Eligibility ----- cluster1-01         true    true </pre>

STEP	ACTION																																																												
26.	<p>List unassigned disks on the node by entering the <b>storage disk show</b> command:</p> <pre>cluster1::&gt; storage disk show</pre> <table border="1"> <thead> <tr> <th>Disk</th> <th>Usable</th> <th>Container</th> <th>Aggregate</th> <th>Owner</th> <th>Size</th> <th>Shelf</th> <th>Bay</th> <th>Type</th> <th>Position</th> </tr> </thead> <tbody> <tr> <td>cluster1-01:v4.16</td> <td>-</td> <td>-</td> <td>-</td> <td>unassigned</td> <td>present</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>cluster1-01:v4.17</td> <td>-</td> <td>-</td> <td>-</td> <td>unassigned</td> <td>present</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>cluster1-01:v4.18</td> <td>-</td> <td>-</td> <td>-</td> <td>unassigned</td> <td>present</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>cluster1-01:v4.19</td> <td>-</td> <td>-</td> <td>-</td> <td>unassigned</td> <td>present</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>cluster1-01:v4.20</td> <td>-</td> <td>-</td> <td>-</td> <td>unassigned</td> <td>present</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table> <p>....</p>	Disk	Usable	Container	Aggregate	Owner	Size	Shelf	Bay	Type	Position	cluster1-01:v4.16	-	-	-	unassigned	present	-	-	-	-	cluster1-01:v4.17	-	-	-	unassigned	present	-	-	-	-	cluster1-01:v4.18	-	-	-	unassigned	present	-	-	-	-	cluster1-01:v4.19	-	-	-	unassigned	present	-	-	-	-	cluster1-01:v4.20	-	-	-	unassigned	present	-	-	-	-
Disk	Usable	Container	Aggregate	Owner	Size	Shelf	Bay	Type	Position																																																				
cluster1-01:v4.16	-	-	-	unassigned	present	-	-	-	-																																																				
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cluster1-01:v4.18	-	-	-	unassigned	present	-	-	-	-																																																				
cluster1-01:v4.19	-	-	-	unassigned	present	-	-	-	-																																																				
cluster1-01:v4.20	-	-	-	unassigned	present	-	-	-	-																																																				
27.	<p>Add the unassigned disks to the node by entering the <b>storage disk assign</b> command:</p> <pre>cluster1::&gt; storage disk assign -all true -node cluster1-01</pre>																																																												
28.	<p>Verify that all the disks are assigned by entering the <b>storage disk show</b> command.</p> <p><b>NOTE:</b> Do not shut down the simulator. However, you can minimize the console window.</p> <p>In the next task you will join a second simulator to create a 2-node cluster.</p>																																																												

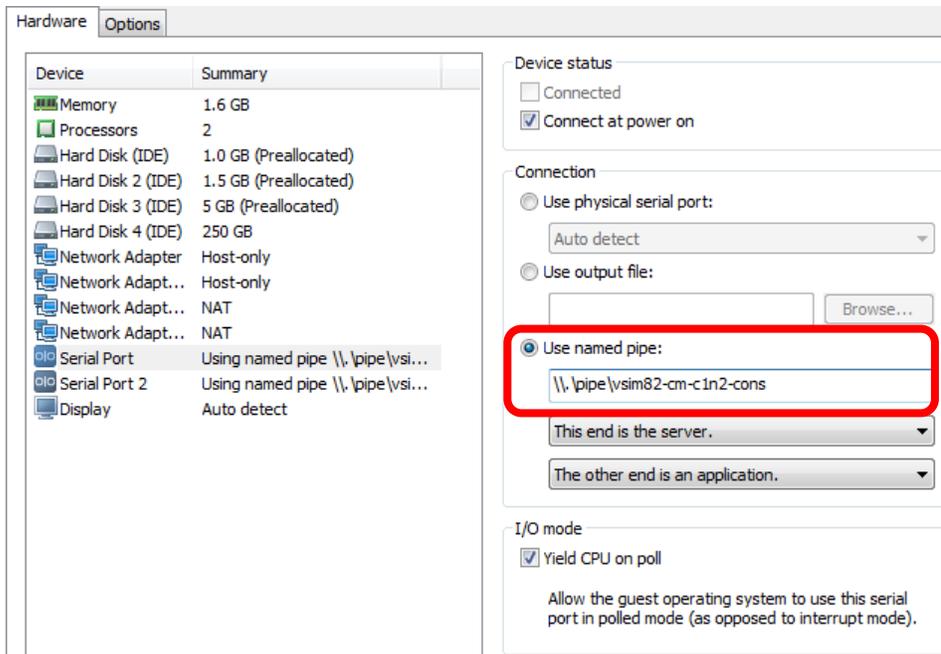
## TASK 6: JOIN A SECOND NODE TO THE CLUSTER

In this task, you add a second node to the cluster that you created in the previous task.

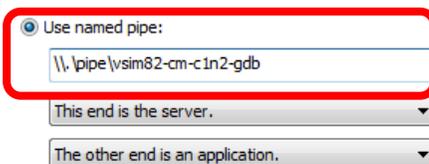
**NOTE:** You must perform an additional step on the second node because the storage system "System ID" is hardcoded in the provided Simulate ONTAP image. Each Simulate ONTAP node in a cluster must have a unique system ID and serial number.

1.	Extract a second set of simulator files for the second node. (See <a href="#">Task 4.</a> )
2.	Navigate to <b>Documents\Virtual Machines\vsim_netapp-cm</b> and rename the new folder “ <b>vsim82-cm-c1n2</b> ” to identify it as the second node.
3.	Run a second instance of VMware Player and open the second node (DataONTAP.vmx file in the vsim82-cm-c1n2 directory). <b>NOTE:</b> <i>Do not</i> play the virtual machine.
4.	Select the new virtual machine and click <b>Edit virtual machine settings</b> . 

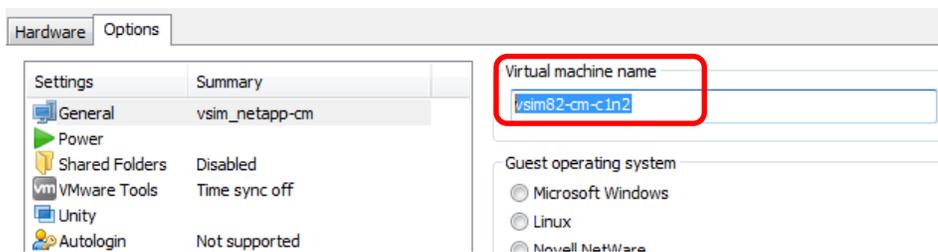
5. On the **Hardware** tab, select the **Serial Port** device and rename the “Use named pipe” to `\\.\pipe\vsim82-cm-c1n2-cons` (named to identify the simulator folder.)

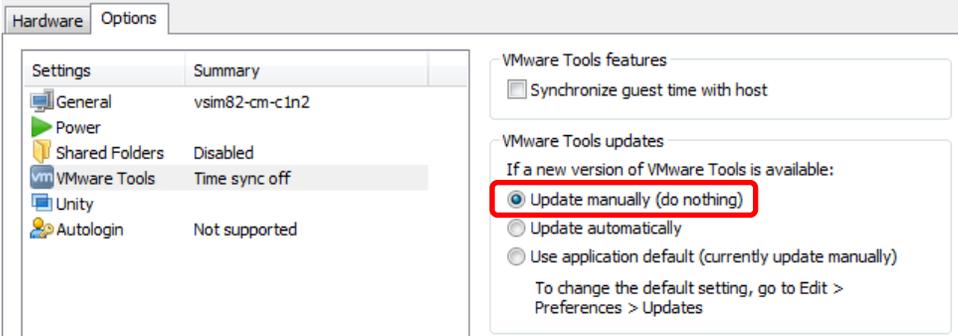


6. On the **Hardware** tab, select the **Serial Port 2** device and rename the “Use named pipe” to `\\.\pipe\vsim82-cm-c1n2-gdb`

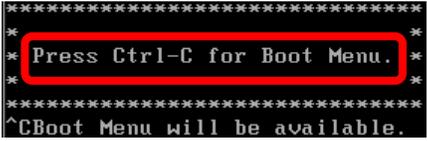
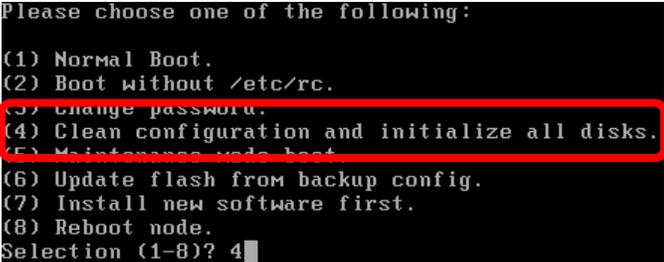


7. Click the **Options** tab, select **General** settings, and rename the virtual machine to `vsim82-cm-c1n2`. Leave the other settings at their default values.

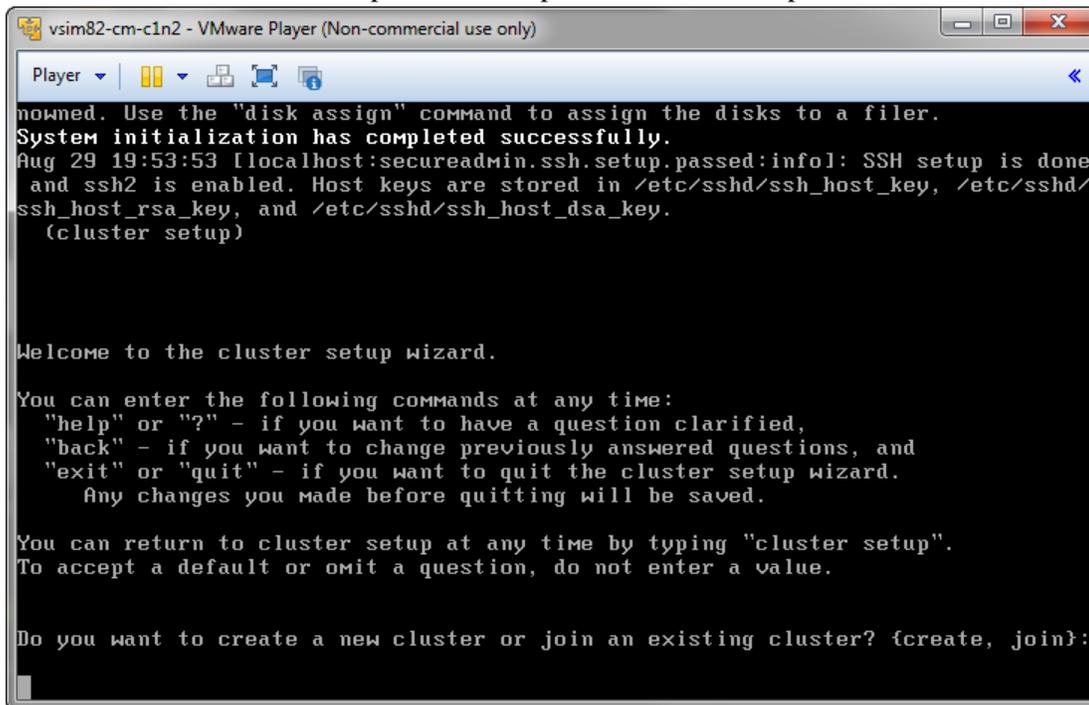


<p><b>8.</b></p>	<p>On the <b>Options</b> tab, select <b>VMware Tools</b> settings and select “<b>Update manually (do nothing)</b>”.</p> <p>Make this change because Simulate ONTAP 8.2 software does not require VMware Tools.</p> <p>Leave the other settings at their default values.</p> 
<p><b>9.</b></p>	<p>Click <b>OK</b> to save your changes and close the Virtual Machine Settings windows.</p>
<p><b>10.</b></p>	<p>You will need to change the system ID and serial number of the second node before joining the cluster.</p> <p>The following steps require timely action and total attention. Before you begin, consider the following points:</p> <ul style="list-style-type: none"> <li>• You will only have 10 seconds to enter a special prompt to change the system ID and serial number.</li> <li>• You should review the screenshot in step 12 before starting the next step.</li> <li>• You must change the system ID and serial number before the boot menu appears or the simulator files will become corrupted and you will need to start Task 6 from the beginning.</li> <li>• Sometimes the boot menu is blocked by a VMware Player message.</li> </ul>
<p><b>11.</b></p>	<p>Select <b>vsim82-cm-c1n2</b>, and click “<b>Play virtual machine</b>”.</p> <p><b>NOTE:</b> If a Software Updates dialog box appears, click the <b>Remind Me Later</b>.</p>

<p><b>12.</b></p>	<p>When the “Hit [Enter] to boot immediately, or any other key for command prompt. Booting in 10 seconds...” appears, press the <b>Space Bar</b>.</p> <p>A <b>VLOADER&gt;</b> prompt appears.</p>  <pre> 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@bld1svlprod12.eng.netapp.com, Tue Mar 26 21:11:26 PDT 2013) Loading /boot/defaults/loader.conf : Hit [Enter] to boot immediately, or any other key for command prompt. Booting in 9 seconds...  Type '?' for a list of commands, 'help' for more detailed help. VLOADER&gt; _ </pre>
<p><b>13.</b></p>	<p>Set the serial number and system ID for this node by entering the following commands:</p> <pre> VLOADER&gt; <b>setenv SYS_SERIAL_NUM 4034389-06-2</b> VLOADER&gt; <b>setenv bootarg.nvram.sysid 4034389062</b> </pre>
<p><b>14.</b></p>	<p>Verify that the information was saved correctly by entering the following commands:</p> <pre> VLOADER&gt; <b>printenv SYS_SERIAL_NUM</b> 4034389-06-2 VLOADER&gt; <b>printenv bootarg.nvram.sysid</b> 4034389062 </pre>
<p><b>15.</b></p>	<p>Boot the node by entering the following commands:</p> <pre> VLOADER&gt; <b>boot</b> </pre> <p>The simulator boots with the new system ID and serial number.</p> <p>Next, you must clean the configuration from the boot menu.</p>

<p>16.</p>	<p>When the “Press Ctrl-C for Boot Menu” message appears, press <b>Ctrl-C</b>.</p>  <p>The “Boot Menu will be available” message appears. Wait until the boot menu is displayed.</p> <p>If you receive a “WARNING: System id mismatch...” message, then the cf card may have been corrupted. Usually corruption is caused if the simulator is booted incorrectly or the serial number and system ID were entered incorrectly. You might need to start the task over.</p> <p><b>NOTE:</b> Before the boot menu appears, you might see disk messages. Ignore them.</p>
<p>17.</p>	<p>When the boot menu appears, enter <b>4</b> (for a clean configuration) and press the <b>Enter</b> key.</p> 
<p>18.</p>	<p>At the “Zero disk, reset config and install a new file system?” prompt, enter the letter <b>y</b> and press the <b>Enter</b> key.</p>
<p>19.</p>	<p>At the confirmation prompt, enter the letter <b>y</b> and press the <b>Enter</b> key.</p> <p><b>NOTE:</b> If you see more messages, ignore them.</p> <p>The virtual machine restarts automatically and begins the reset process.</p>
<p>20.</p>	<p>Wait until the reset process is completely finished</p> <p><b>NOTE:</b> If you stop the process, you can corrupt the simulator files (simulator disks) and then you must extract them again.</p>

21. After the virtual machine reset process is complete, the cluster setup wizard starts.



```
owned. Use the "disk assign" command to assign the disks to a filer.
System initialization has completed successfully.
Aug 29 19:53:53 [localhost:secureadmin.ssh.setup.passed:info]: SSH setup is done
and ssh2 is enabled. Host keys are stored in /etc/ssh/ssh_host_key, /etc/ssh/
ssh_host_rsa_key, and /etc/ssh/ssh_host_dsa_key.
(cluster setup)

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}:
```

**NOTE:** If you make a mistake during cluster setup, press **Ctrl-C** to interrupt the wizard. Restart the wizard by re-entering **cluster setup** at the cluster shell prompt.

22. At the prompt, enter **join** to join the existing cluster.

```
Do you want to create a new cluster or join an existing cluster?
{create, join}:
join
```

23. Enter **yes** to accept the default values for cluster network configuration.

```
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]: yes
```

24. Enter **cluster1** to join the existing cluster.

```
Enter the name of the cluster you would like to join [cluster1]:
cluster1
```

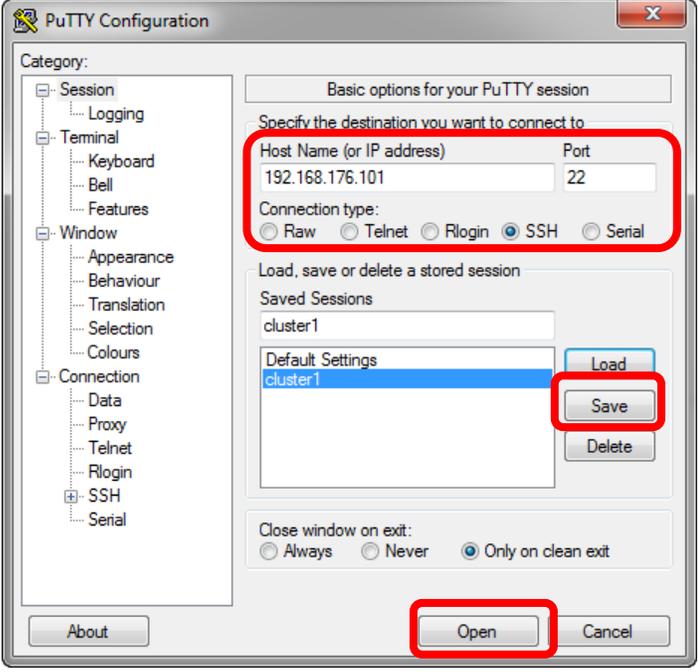
25. Wait while node 2 joins the cluster.

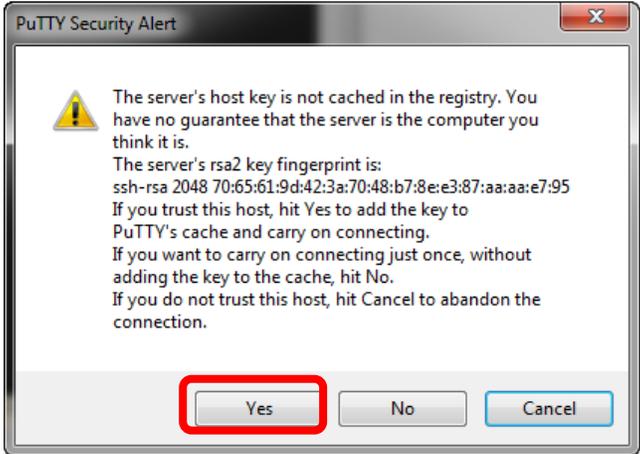
<p><b>26.</b></p>	<p>Enter the node management interface values. Replace the <i>x</i> with the value you identified in <a href="#">Task 5</a>.</p> <p>Enter the node management interface port [e0c]: <b>e0c</b></p> <p>Enter the node management interface IP address: <b>192.168.x.92</b></p> <p>Enter the node management interface netmask: <b>255.255.255.0</b></p> <p>Enter the node management interface default gateway: <b>192.168.x.1</b></p> <p>The setup wizard will continue to create the node management interface.</p>												
<p><b>27.</b></p>	<p>Press the <b>Enter</b> key to leave AutoSupport enabled.</p> <p>Press enter to continue:</p> <p>...</p> <p>Exiting the cluster setup wizard.</p>												
<p><b>28.</b></p>	<p>Log in to check the status of your new cluster, enter the <b>cluster show</b> command at the console.</p> <p>login: <b>admin</b></p> <p>Password:</p> <p>cluster1::&gt; <b>cluster show</b></p> <table border="0"> <thead> <tr> <th>Node</th> <th>Health</th> <th>Eligibility</th> </tr> </thead> <tbody> <tr> <td>-----</td> <td>-----</td> <td>-----</td> </tr> <tr> <td>cluster1-01</td> <td>true</td> <td>true</td> </tr> <tr> <td>cluster1-02</td> <td>true</td> <td>true</td> </tr> </tbody> </table>	Node	Health	Eligibility	-----	-----	-----	cluster1-01	true	true	cluster1-02	true	true
Node	Health	Eligibility											
-----	-----	-----											
cluster1-01	true	true											
cluster1-02	true	true											
<p><b>29.</b></p>	<p>List unassigned disks on the node by entering the <b>storage disk show</b> command:</p> <p>cluster1::&gt; <b>storage disk show</b></p>												
<p><b>30.</b></p>	<p>Add the unassigned disks to the node by entering the <b>storage disk assign</b> command:</p> <p>cluster1::&gt; <b>storage disk assign -all true -node cluster1-02</b></p>												
<p><b>31.</b></p>	<p>Verify that all the disks are assigned by entering the <b>storage disk show</b> command.</p> <p>You have completed a 2-node cluster setup.</p> <p><b>NOTE:</b> Do not shut down the simulator. However, you can minimize the console window. If you need to shut down the cluster, refer to <a href="#">task 9</a>.</p>												

## TASK 7: MANAGE THE CLUSTER USING THE CLI

You can manage the cluster using various tools. Use a terminal client called PuTTY to manage the cluster using CLI.

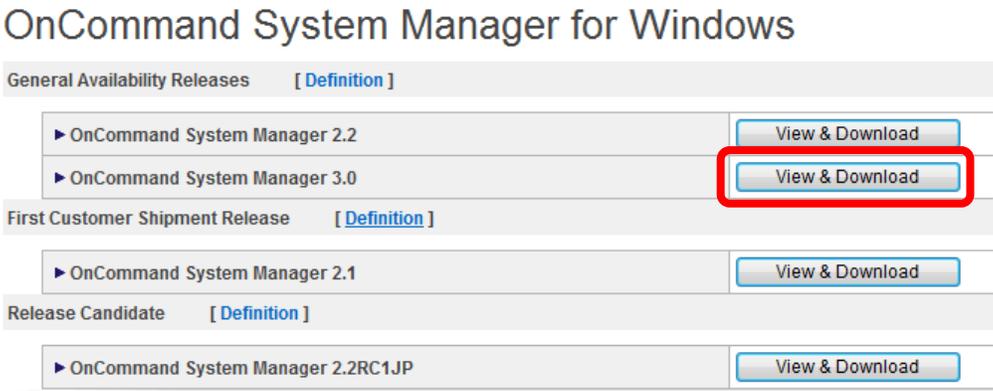
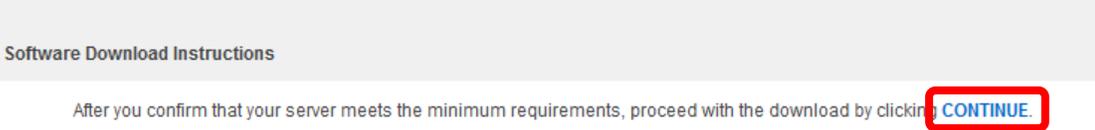
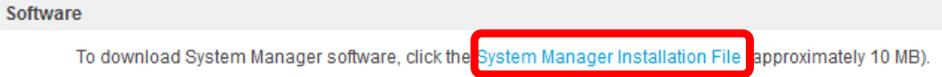
**NOTE:** If you cannot connect to the cluster, ensure that you are not connected to a VPN.

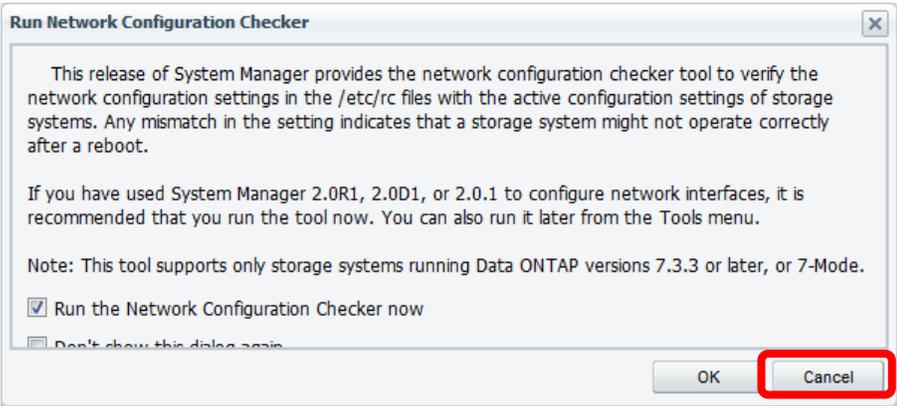
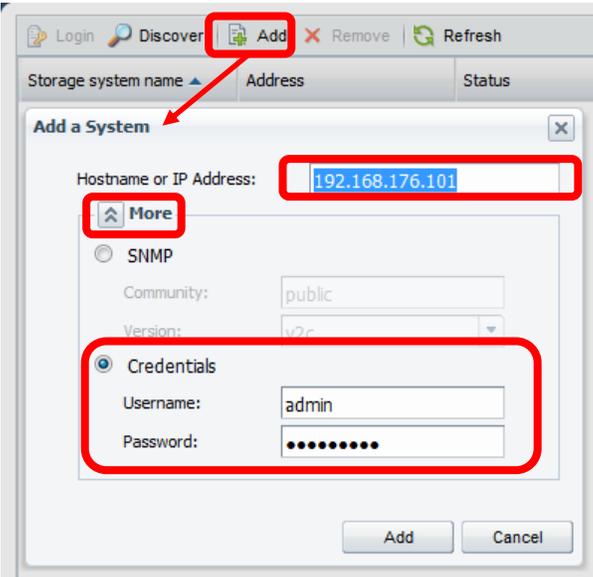
STEP	ACTION															
1.	<p>If you do not already have PuTTY, download it to your desktop from here:  <a href="http://www.putty.org">http://www.putty.org</a></p> <p><b>Binaries</b></p> <p><i>The latest release version (beta 0.62).</i> This will generally be a version I think is reasonably likely 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.</p> <p><b>For Windows on Intel x86</b></p> <table border="0"> <tr> <td>PuTTY:</td> <td><a href="#">putty.exe</a></td> <td>(or by FTP)</td> <td>(RSA sig)</td> <td>(DSA sig)</td> </tr> <tr> <td>PuTTYtel:</td> <td><a href="#">puttytel.exe</a></td> <td>(or by FTP)</td> <td>(RSA sig)</td> <td>(DSA sig)</td> </tr> <tr> <td>PSCP:</td> <td><a href="#">pscp.exe</a></td> <td>(or by FTP)</td> <td>(RSA sig)</td> <td>(DSA sig)</td> </tr> </table> <p>You could also move or copy the file to your desktop.</p>	PuTTY:	<a href="#">putty.exe</a>	(or by FTP)	(RSA sig)	(DSA sig)	PuTTYtel:	<a href="#">puttytel.exe</a>	(or by FTP)	(RSA sig)	(DSA sig)	PSCP:	<a href="#">pscp.exe</a>	(or by FTP)	(RSA sig)	(DSA sig)
PuTTY:	<a href="#">putty.exe</a>	(or by FTP)	(RSA sig)	(DSA sig)												
PuTTYtel:	<a href="#">puttytel.exe</a>	(or by FTP)	(RSA sig)	(DSA sig)												
PSCP:	<a href="#">pscp.exe</a>	(or by FTP)	(RSA sig)	(DSA sig)												
2.	<p>Enter the following information in the appropriate fields:</p> <ul style="list-style-type: none"> <li>Enter the cluster management interface IP address in the Host Name (or IP address) field: <b>192.168.x.101</b> (x=your subnet)</li> <li>Verify that the SSH Radio Button is selected and the port is <b>22</b>.</li> <li>Enter the cluster name in Saved Sessions field, then press the <b>Save</b> button.</li> </ul> 															
3.	<p>Start a CLI session by selecting the cluster name and pressing the <b>Open</b> button.</p>															

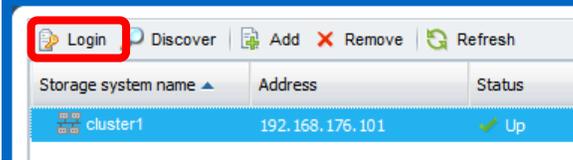
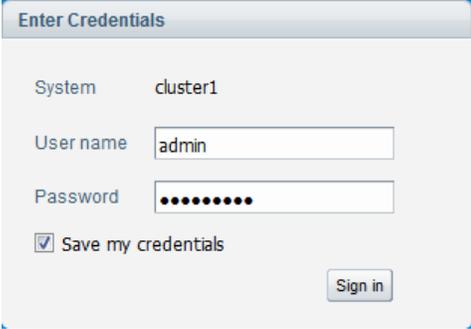
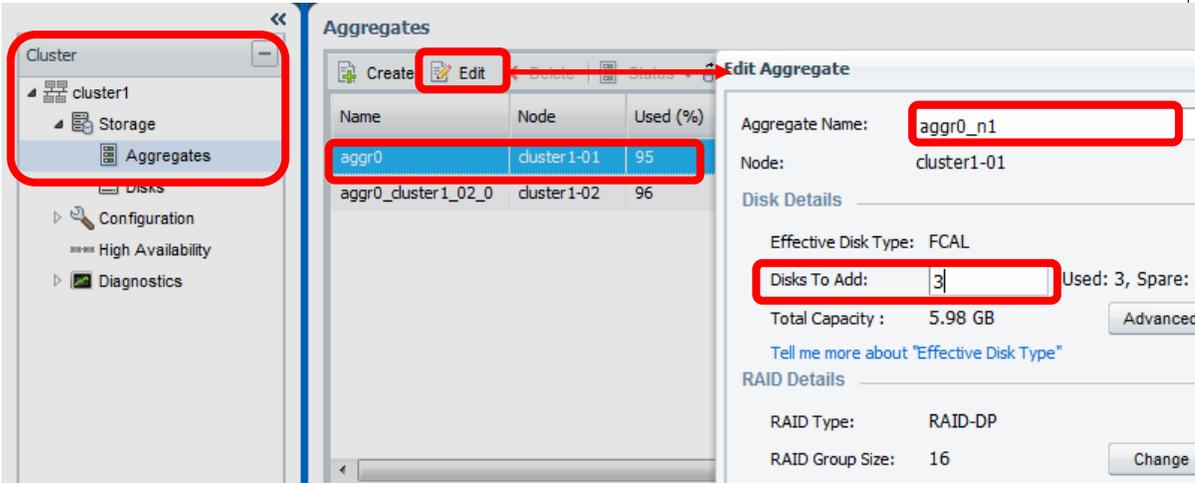
STEP	ACTION
4.	<p>Select <b>Yes</b> to the PuTTY Security Alert to allow PuTTY to communicate with the cluster.</p> 
5.	Log in to the cluster.
6.	Hold the <b>Shift</b> key and then press the <b>?</b> key to list the commands available.
7.	Enter the <b>cluster show</b> command and compare the output with the VMware console windows.
8.	<p>Now you can manage, configure, and create resources on the cluster using the CLI by entering these commands:</p> <p><b>network port show</b></p> <p><b>net int show</b> (Notice “network interface show” under the command.)</p> <p><b>vserver show</b></p> <p><b>show</b> (Notice that show is too ambiguous. Enter <b>vserver</b> and notice the prompt change, then enter <b>show</b>.)</p> <p><b>top</b> (Notice the prompt change back.)</p> <p><b>vol</b> then the <b>Tab</b> key (Notice vol change to volume.)</p> <p><b>s</b> then the <b>Tab</b> key (s is too ambiguous.)</p> <p>For more information on commands and parameters, consult the “<i>Command Reference Guide</i>” or enter the on-line manual pages by entering the following command:</p> <p><b>Man</b> (Enter <b>q</b> to exit the manual page)</p>
9.	When you are finished with PuTTY, close the window (session) and go to the next task.

## TASK 8: MANAGE THE CLUSTER USING ONCOMMAND SYSTEM MANAGER 3.0

As an alternative to managing the cluster using CLI, you can also use OnCommand System Manager.

STEP	ACTION
1.	<p>Download OnCommand System Manager from the NetApp Support site:  <a href="http://support.netapp.com/NOW/cgi-bin/software">http://support.netapp.com/NOW/cgi-bin/software</a></p>  <p>Choose Windows from the drop-down menu and press <b>Go!</b></p>
2.	<p>Click the <b>View &amp; Download</b> button for OnCommand System Manager 3.0:</p> 
3.	<p>Read the page, click the <b>CONTINUE</b> link at the bottom of the page and <b>Accept</b> the EULA on the following page.</p> 
4.	<p>Download the software by clicking the <b>System Manager Installation File</b> link.</p> 
5.	<p>After the download is complete, run the installer by following these steps:</p> <ol style="list-style-type: none"> <li>Select <b>Next</b> (or Install) buttons to accept the defaults and complete the install.</li> <li>On the last install screen click the <b>Finish</b> button.</li> </ol>

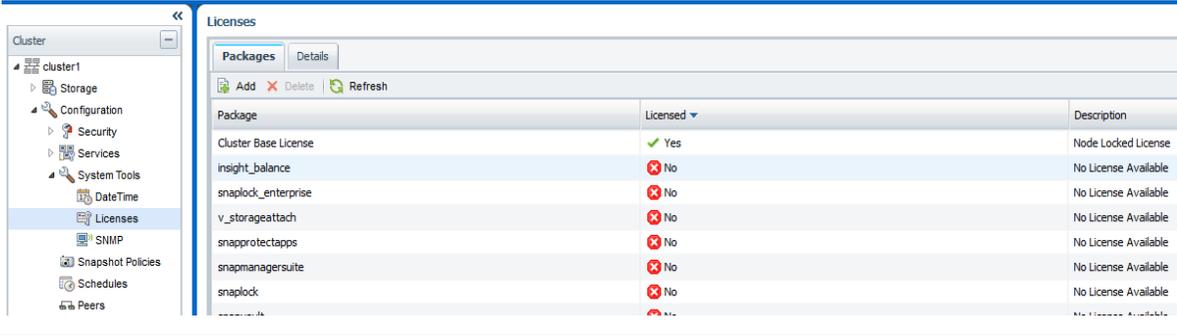
STEP	ACTION
6.	<p>Run NetApp OnCommand System Manager 3.0 by double-clicking the desktop icon that was created by the installer.</p> <p>Your default browser opens.</p> <p><b>NOTE:</b> Some versions of Microsoft Internet Explorer® software may have compatibility issues. Consider installing Mozilla® Firefox® software and set it as the default browser (<a href="http://www.mozilla.org">www.mozilla.org</a>).</p>
7.	<p>If the “Run Network Configuration Checker” dialog appears, press the <b>Cancel</b> button because this environment is simulated.</p> 
8.	<p>On the Home Tab, click the <b>Add</b> button to add your cluster.</p>
9.	<p>Enter the following information in the Add a System dialog box:</p> <ul style="list-style-type: none"> <li>• Enter the cluster management interface: <b>192.168.x.101</b> (x=your subnet)</li> <li>• Click the <b>More</b> button to open more options and select <b>Credentials</b></li> <li>• Enter your user name and password in the appropriate fields.</li> </ul> 

STEP	ACTION
10.	Click the <b>Add</b> button to add your cluster.
11.	<p>After the cluster has been added, log in by selecting the cluster and click the <b>Login</b> button.</p> 
12.	<p>Enter your credentials, ensure <b>Save my credentials</b> is checked, and click the <b>Sign in</b> button.</p> 
13.	<p>Rename an aggregate for easier identification, and add more disks to compensate for the small simulated disks by following these steps:</p> <ol style="list-style-type: none"> <li>Expand the <b>Cluster&gt;cluster1&gt;Storage</b> node and select <b>Aggregates</b>.</li> <li>Select <b>aggr0</b> (node 1) and press <b>Edit</b>.</li> <li>In the Aggregate name field enter <b>aggr0_n1</b>.</li> <li>In the Disks To Add field enter <b>3</b>.</li> <li>Click the <b>Save and Close</b> button.</li> </ol> 
14.	Rename the aggregate for node 2 <b>aggr0_n2</b> and add 3 disk, then click the <b>Save and Close</b> button.

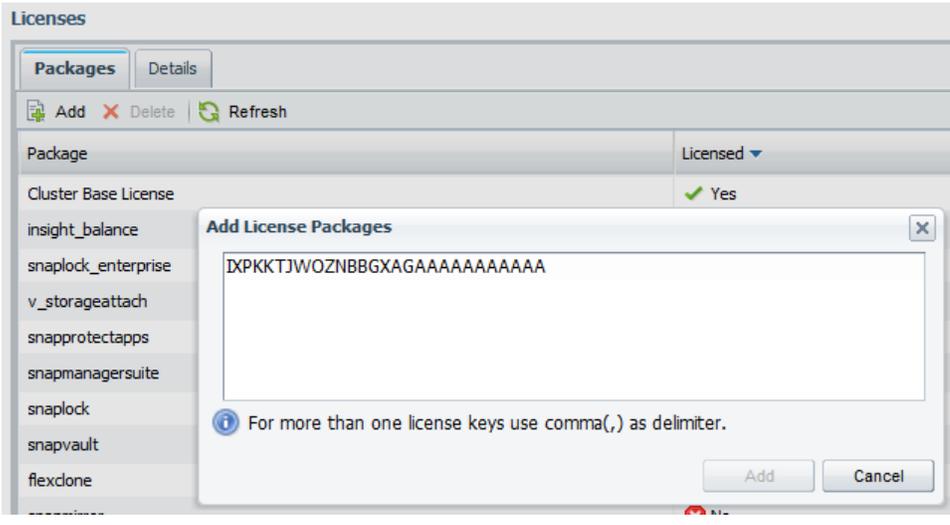
STEP	ACTION
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**15.** Add licenses using OnCommand System Manager by following these steps:

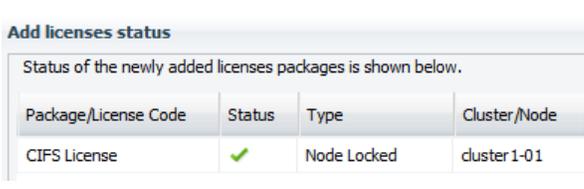
- Expand the **Cluster>cluster1>Configuration>System Tools>** node.
- Select **Licenses**.
- Review the packages tab and notice that no features are licensed (except the Cluster Base License).



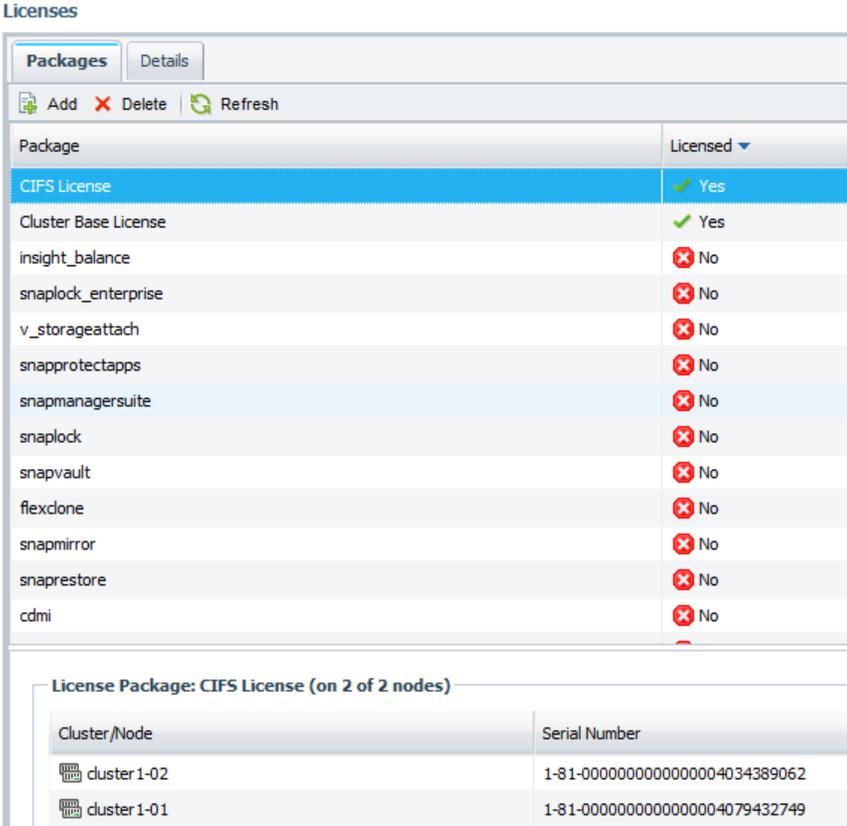
**16.** Enter the key for CIFS using the licenses that you downloaded in [Task 2](#) and click the **Add** button. Use the license codes listed in the “Licenses for the non-ESX build (Serial Number 4079432749)” (for example, IXPKKTJWOZNBGGXAGAAAAAAAAAAAA).



**17.** Review the “Add license status” section, notice that this license code is Node Locked to the serial number of Node 1. Click the **Close** button.



**18.** After you add the license, select the package and review the License Package section. This cluster has two nodes, so you must add the license code for the second node.

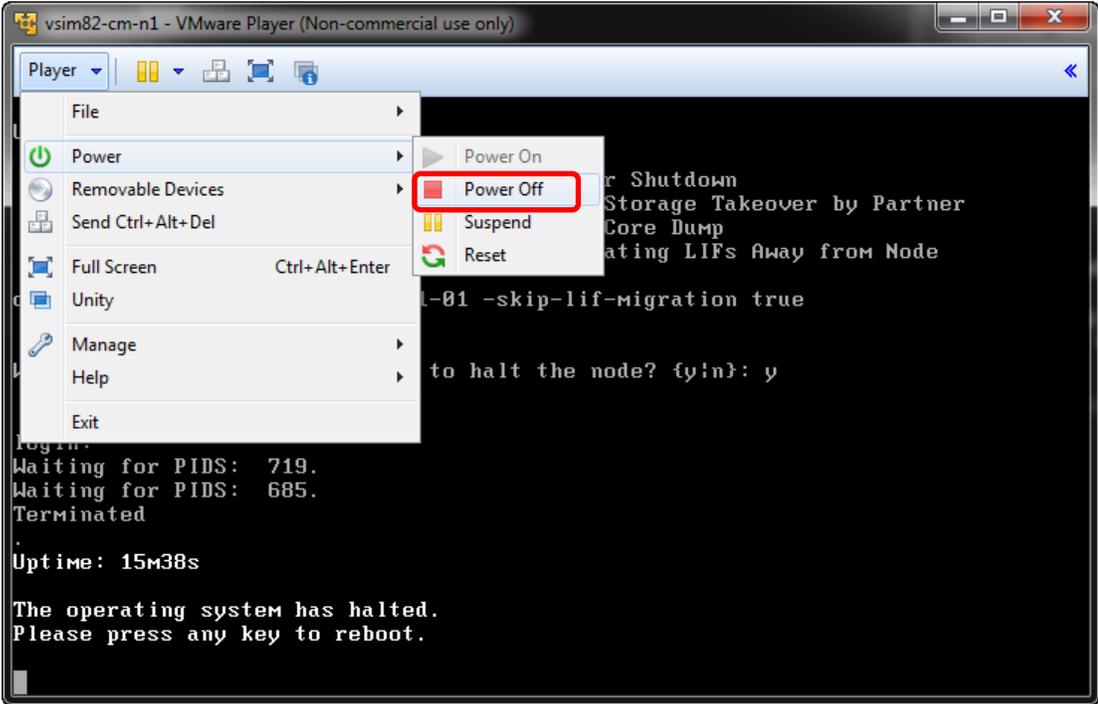
STEP	ACTION
19.	<p>Enter the second key for CIFS using the licenses that you downloaded in <a href="#">Task 2</a>.</p> <p>Use the license codes listed in the “Licenses for the second node in a cluster (Serial Number 4034389062)” (for example, MHEYKUNFXMSMUCEZFAAAAAAAAAAAA).</p>
20.	<p>Select CIFS License again and review the changes.</p> 
21.	<p>You can add all the licenses for all the nodes by following the instructions in the <a href="#">Appendix</a>.</p>
22.	<p>Manage, configure and create resources on the cluster using OnCommand System Manager.</p> <p><b>NOTE:</b> You must create data aggregates and a data Vserver to put client data on the cluster. Creating a Vserver is not covered in this guide. Refer to the “Clustered Data ONTAP 8.2 System Administration Guide for Vserver Administrators” on NetApp Support documentation (<a href="http://support.netapp.com/portal/documentation">http://support.netapp.com/portal/documentation</a>).</p>
23.	<p>When you are finished with OnCommand System Manager, close the window and go to the next task, which explains how to shut down the simulator properly.</p>

### TASK 9: SHUT DOWN THE CLUSTER PROPERLY

You must shut down the simulators properly before you close VMware Player.

**NOTE:** If the simulators are not shut down properly, the virtual machine files can be corrupted.

STEP	ACTION
1.	Open the VMware Player console window of both nodes so that you can see them both on screen.
2.	From one of the node consoles, log in and enter the <b>node show</b> command to identify the nodenames in the cluster.
3.	<p>Enter the <b>halt all</b> command and enter <b>y</b> to halt the nodes. Observe how both nodes begin the shutdown process.</p> <pre data-bbox="284 625 1068 997">cluster1::&gt; halt all (system node halt)  Warning: Are you sure you want to halt the node? {y!n}: y 2 entries were acted on.  login: Waiting for PIDS: /usr/sbin/yppbind 719. . Terminated Uptime: 13m7s  The operating system has halted. Please press any key to reboot.</pre>
4.	<p>Wait for the message “The operating system has halted. Please press any key to reboot.” on both nodes.</p> <pre data-bbox="284 1102 717 1207">The operating system has halted. Please press any key to reboot.</pre>

STEP	ACTION
5.	<p>Power down the virtual machines by selecting <b>Player&gt;Power&gt;Power Off</b> and pressing <b>Yes</b>.</p>  <p>The screenshot shows the VMware Player interface for a virtual machine named 'vsim82-cm-n1'. The 'Player' menu is open, and the 'Power' sub-menu is displayed. The 'Power Off' option is highlighted with a red rectangle. The background shows a terminal window with the following text: 'r Shutdown', 'Storage Takeover by Partner', 'Core Dump', 'ating LIFs Away from Node', 'l-01 -skip-lif-migration true', 'to halt the node? {y;n}: y', 'Login:', 'Waiting for PIDS: 719.', 'Waiting for PIDS: 685.', 'Terminated', 'Uptime: 15m38s', and 'The operating system has halted. Please press any key to reboot.'</p>
6.	Close the VMware Player window.
7.	Repeat this task to power off the other node.

## TASK 10: RESTART THE CLUSTER

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

**NOTE:** If the cluster is not started properly, it can become corrupted and must be recreated.

STEP	ACTION
1.	Open VMware Player, select node 1 and play the virtual machine.
2.	Wait until node 1 is completely started and log in.
3.	Enter the <b>cluster show</b> command to verify that node 1 is healthy.
4.	Open a second VMware Player, select node 2 and play the virtual machine.
5.	Wait until node 2 is completely started and log in.
6.	<p>Enter the <b>cluster show</b> command to verify both nodes in the cluster are healthy.</p> <pre>login: admin Password: cluster1::&gt; cluster show Node           Health  Eligibility ----- cluster1-01    true   true cluster1-02    true   true 2 entries were displayed. cluster1::&gt; █</pre> <p>You have successfully restarted the cluster.</p>

## APPENDIX: LICENSES

The licenses listed here are from the license file on the NetApp Support site. They have been formatted to easily copy and paste into either Putty or OnCommand System Manager 3.0. The VMware Player console does not allow for copy and paste operations.

To add all the licenses at once, follow these steps:

- a) Copy the “**All licenses**” block in step 3 and paste into a text editor such as WordPad.
- b) Correct any formatting issues (licenses are comma separated with no spaces).
- c) Copy and paste the block into the license add feature in OnCommand System Manager.

**NOTE:** If you copy the license block from a pdf and past directly into OnCommand System Manager, formatting errors can occur. Pasting into a text editor first will allow you to fix any formatting errors.

STEP	ACTION																														
1.	<p><b>Cluster1, Node 1 - non-esx licenses (Serial Number 4079432749)</b></p> <p>Cluster Base License (Serial Number 1-80-000008)</p> <p>SMKQROWJNQYQSDAAAAAAAAAAAAAAAA</p> <table border="0"> <thead> <tr> <th data-bbox="282 877 375 905">Feature</th> <th data-bbox="686 877 849 905">License Code</th> </tr> <tr> <th data-bbox="282 936 375 963">-----</th> <th data-bbox="686 936 956 963">-----</th> </tr> </thead> <tbody> <tr> <td data-bbox="282 974 354 1001">CIFS</td> <td data-bbox="686 974 1183 1001">IXPKKTJWOZNBBGXAGAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 1016 337 1043">FCP</td> <td data-bbox="686 1016 1183 1043">GMLOLTJWOZNBBGXAGAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 1058 444 1085">FlexClone</td> <td data-bbox="686 1058 1183 1085">CQCWNTJWOZNBBGXAGAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 1100 548 1127">Insight_Balance</td> <td data-bbox="686 1100 1183 1127">IDNWRTJWOZNBBGXAGAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 1142 375 1169">iSCSI</td> <td data-bbox="686 1142 1183 1169">URNZKTJWOZNBBGXAGAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 1184 337 1211">NFS</td> <td data-bbox="686 1184 1183 1211">WCSVJTJWOZNBBGXAGAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 1226 428 1253">SnapLock</td> <td data-bbox="686 1226 1183 1253">AFYZOTJWOZNBBGXAGAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 1268 618 1295">SnapLock_Enterprise</td> <td data-bbox="686 1268 1183 1295">WIPHRTJWOZNBBGXAGAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 1310 477 1337">SnapManager</td> <td data-bbox="686 1310 1183 1337">MZVOPTJWOZNBBGXAGAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 1352 461 1379">SnapMirror</td> <td data-bbox="686 1352 1183 1379">QVEHNTJWOZNBBGXAGAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 1394 477 1421">SnapProtect</td> <td data-bbox="686 1394 1183 1421">YTTDQTJWOZNBBGXAGAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 1436 477 1463">SnapRestore</td> <td data-bbox="686 1436 1183 1463">EBHSMTJWOZNBBGXAGAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 1478 444 1505">SnapVault</td> <td data-bbox="686 1478 1183 1505">OKALOTJWOZNBBGXAGAAAAAAAAAAAA</td> </tr> </tbody> </table>	Feature	License Code	-----	-----	CIFS	IXPKKTJWOZNBBGXAGAAAAAAAAAAAA	FCP	GMLOLTJWOZNBBGXAGAAAAAAAAAAAA	FlexClone	CQCWNTJWOZNBBGXAGAAAAAAAAAAAA	Insight_Balance	IDNWRTJWOZNBBGXAGAAAAAAAAAAAA	iSCSI	URNZKTJWOZNBBGXAGAAAAAAAAAAAA	NFS	WCSVJTJWOZNBBGXAGAAAAAAAAAAAA	SnapLock	AFYZOTJWOZNBBGXAGAAAAAAAAAAAA	SnapLock_Enterprise	WIPHRTJWOZNBBGXAGAAAAAAAAAAAA	SnapManager	MZVOPTJWOZNBBGXAGAAAAAAAAAAAA	SnapMirror	QVEHNTJWOZNBBGXAGAAAAAAAAAAAA	SnapProtect	YTTDQTJWOZNBBGXAGAAAAAAAAAAAA	SnapRestore	EBHSMTJWOZNBBGXAGAAAAAAAAAAAA	SnapVault	OKALOTJWOZNBBGXAGAAAAAAAAAAAA
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STEP	ACTION																														
2.	<p><b>Cluster1, Node 2 - second node licenses (Serial Number 4034389062)</b></p> <table border="0"> <thead> <tr> <th data-bbox="282 338 678 369">Feature</th> <th data-bbox="686 338 1466 369">License Code</th> </tr> <tr> <td data-bbox="282 394 678 426">-----</td> <td data-bbox="686 394 1466 426">-----</td> </tr> </thead> <tbody> <tr> <td data-bbox="282 436 678 468">CIFS</td> <td data-bbox="686 436 1466 468">MHEYKUNFXMSMUCEZFAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 478 678 510">FCP</td> <td data-bbox="686 478 1466 510">KWZBMUNFXMSMUCEZFAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 520 678 552">FlexClone</td> <td data-bbox="686 520 1466 552">GARJOUNFXMSMUCEZFAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 562 678 594">Insight_Balance</td> <td data-bbox="686 562 1466 594">MNBKSUNFXMSMUCEZFAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 604 678 636">iSCSI</td> <td data-bbox="686 604 1466 636">YBCNLUNFXMSMUCEZFAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 646 678 678">NFS</td> <td data-bbox="686 646 1466 678">ANGJKUNFXMSMUCEZFAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 688 678 720">SnapLock</td> <td data-bbox="686 688 1466 720">EPMNPUNFXMSMUCEZFAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 730 678 762">SnapLock_Enterprise</td> <td data-bbox="686 730 1466 762">ATDVRUNFXMSMUCEZFAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 772 678 804">SnapManager</td> <td data-bbox="686 772 1466 804">QJKCQUNFXMSMUCEZFAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 814 678 846">SnapMirror</td> <td data-bbox="686 814 1466 846">UFTUNUNFXMSMUCEZFAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 856 678 888">SnapProtect</td> <td data-bbox="686 856 1466 888">CEIRQUNFXMSMUCEZFAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 898 678 930">SnapRestore</td> <td data-bbox="686 898 1466 930">ILVFNUNFXMSMUCEZFAAAAAAAAAAAA</td> </tr> <tr> <td data-bbox="282 940 678 972">SnapVault</td> <td data-bbox="686 940 1466 972">SUOYOUNFXMSMUCEZFAAAAAAAAAAAA</td> </tr> </tbody> </table>	Feature	License Code	-----	-----	CIFS	MHEYKUNFXMSMUCEZFAAAAAAAAAAAA	FCP	KWZBMUNFXMSMUCEZFAAAAAAAAAAAA	FlexClone	GARJOUNFXMSMUCEZFAAAAAAAAAAAA	Insight_Balance	MNBKSUNFXMSMUCEZFAAAAAAAAAAAA	iSCSI	YBCNLUNFXMSMUCEZFAAAAAAAAAAAA	NFS	ANGJKUNFXMSMUCEZFAAAAAAAAAAAA	SnapLock	EPMNPUNFXMSMUCEZFAAAAAAAAAAAA	SnapLock_Enterprise	ATDVRUNFXMSMUCEZFAAAAAAAAAAAA	SnapManager	QJKCQUNFXMSMUCEZFAAAAAAAAAAAA	SnapMirror	UFTUNUNFXMSMUCEZFAAAAAAAAAAAA	SnapProtect	CEIRQUNFXMSMUCEZFAAAAAAAAAAAA	SnapRestore	ILVFNUNFXMSMUCEZFAAAAAAAAAAAA	SnapVault	SUOYOUNFXMSMUCEZFAAAAAAAAAAAA
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