Cloud Computing

Practical 7:
Modifying and Migrating VMs

Aims and Objectives

In this week's practical we continue examining how to construct cloud infrastructure, working with the VMware virtualization systems and completing practical tasks aligned with the VMware vSphere Install, Configure, and Manage certification curriculum. This week we examine how to modify the settings of a virtual machine, in particular storage and memory, and the ability to migrate a virtual machine. Migrating a virtual machine is an important mechanism in cloud computing – the ability to move an active VM from one host server to another host server allows the resource usage of the cloud resources to be managed effectively, particularly during peak usage times. Importantly, the ability to move an active VM also allows the number of host servers to be consolidated during non-peak times, in turn allowing unused resources to be shutdown to save electricity costs.

Lab Tasks

In this week's practical, you are required to complete the first two lab tasks:

- Lab 12: Modifying a Virtual Machine
  Note: after completing this lab you will need to close the lab booking and open a new booking, these two labs cannot be completed in one booking.
- Lab 13: Migrating Virtual Machines

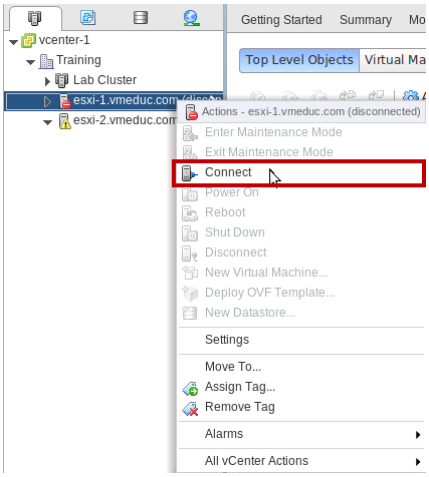
Following the instructions above, start by booking in a POD to complete Lab 10. The instructions for the lab tasks can be found by clicking on the **Show Lab Content** button as explained in Practical 2.

Make sure you follow the lab steps very carefully, otherwise you will encounter problems and be unable to complete the lab tasks.

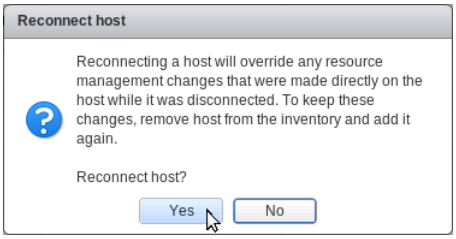
In the following pages, you will find instructions addressing possible problems you may encounter in completing each of the labs. Make sure you refer to these instructions as you complete the relevant lab tasks.

Possible Problems (General)

When the system first starts, it's possible that the infrastructure may not connect correctly. This can be identified by a red symbol appearing on the relevant infrastructure. If you encounter any problems, right click on the problem entry and click **Connect** on the pop-up menu:



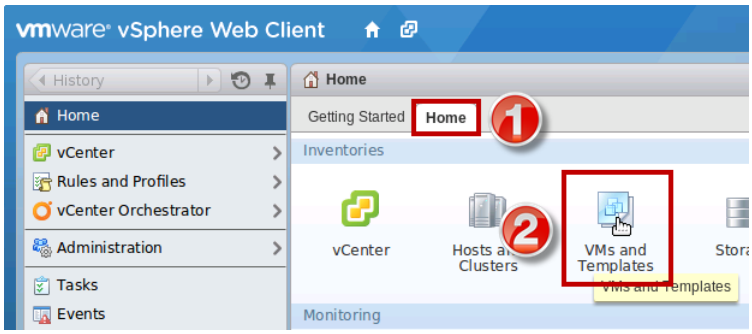
The system will then show a dialog, click **Yes** to confirm the (re-)connection:



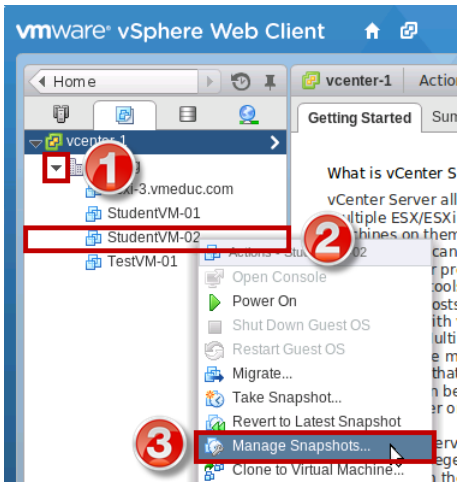
Possible Problems with Lab 12. Modifying a Virtual Machine

Part 1. Increase the Size of a VMDK File

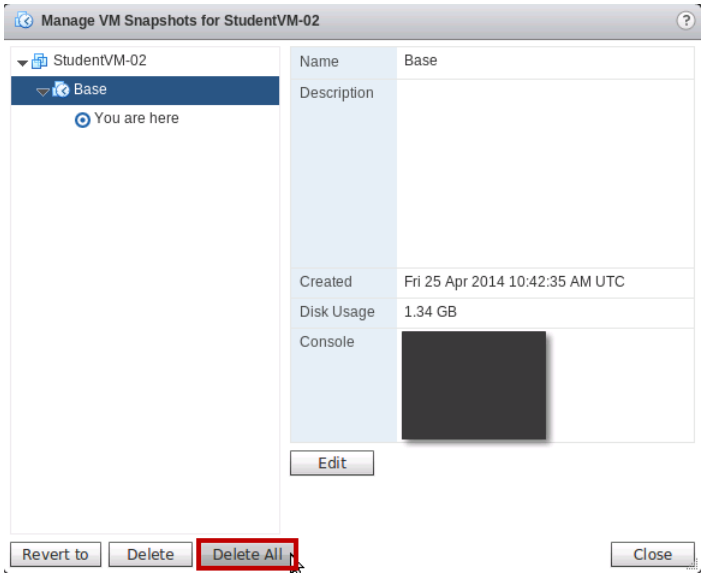
5. On the Home tab, click on VMs and Templates under Inventories in the main workspace area.



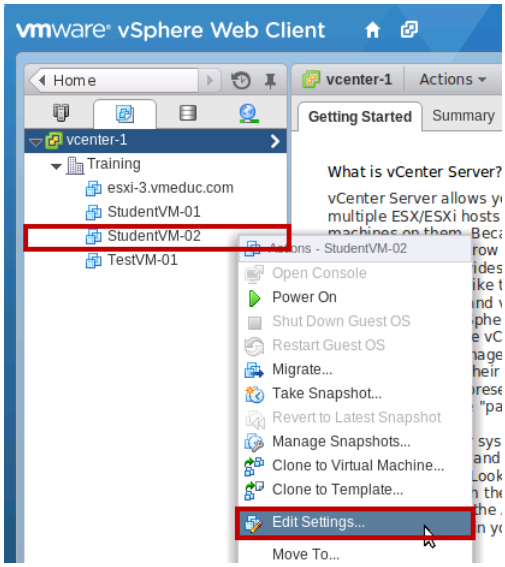
6. Right-click StudentVM-02 in the Object Navigator pane and select Manage Snapshots.

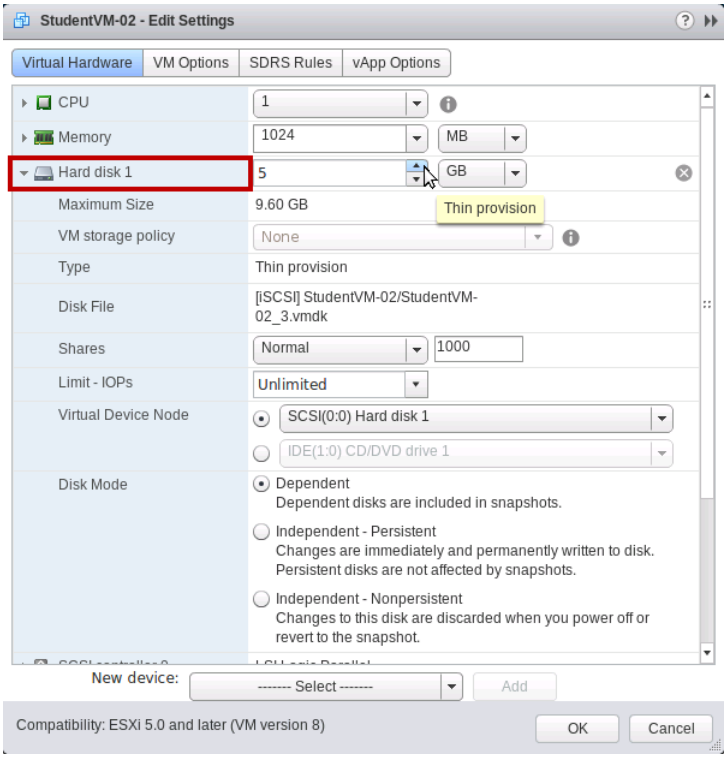


7. In the Manage VM Snapshots wizard, click the Delete All button.

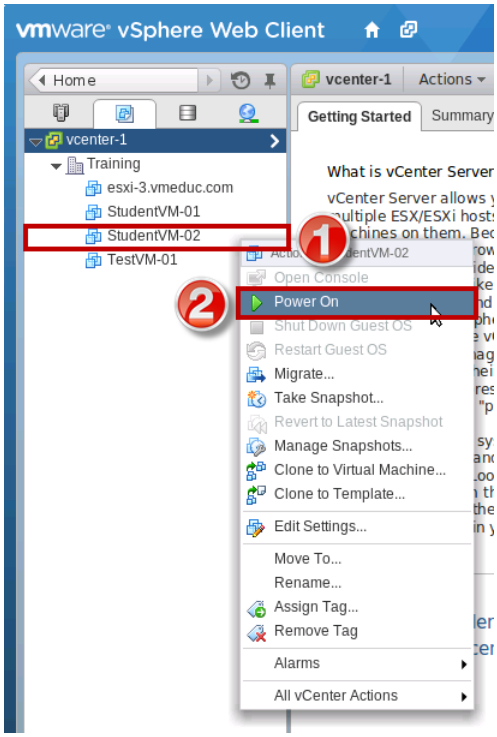


9. Right-click StudentVM-02 in the Object Navigator pane and select Edit Settings. In the Virtual Hardware list, select Hard Disk 1.





12. Power on StudentVM-02 if it is not already.



19. In order to see if the virtual machine detected the expanded hard drive space, type fdisk –l | grep Disk and press Enter. Note the pipe character "|" can be entered by holding the "Shift" key and pressing the "\" key on most keyboards.

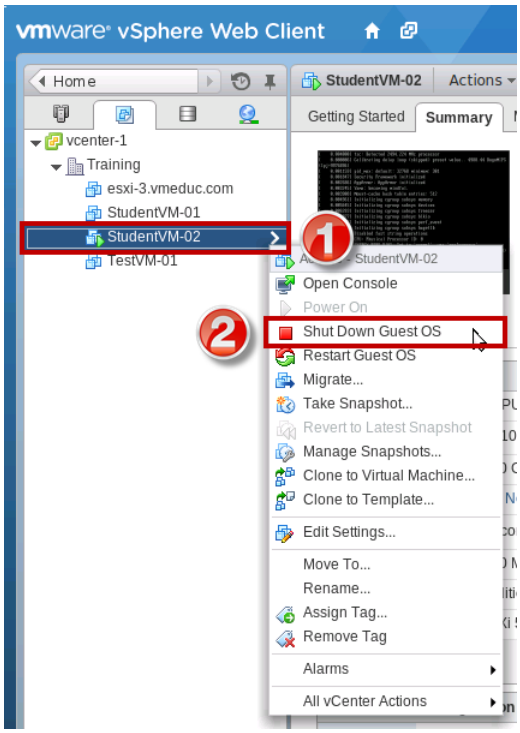
Note that this is the minus symbol followed by a lower-case 'L' (not the number 1).

22. You can close the StudentVM-02 console window by clicking the X button in the upper-left corner of the window. Note: If the console window disappeared before you could manually close it, you can click the Chrome icon and then select the console window. This should bring the window to the foreground so you can close it.

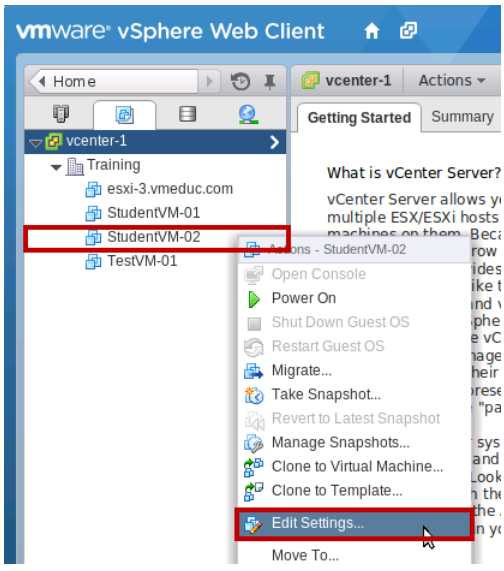
If the system is not responding to your clicking of the **X** button, the most likely cause is that you haven't completed Step 21 properly. Make sure that your window to the vClient is currently selected (in case you clicked outside of the window). Move your mouse into the StudentVM-02 window, then hold down the **CTRL** and **ALT** keys. Move the mouse outside of the StudentVM-02 window, while keeping it inside the vClient window. If you are still having difficulties, while holding CTRL and ALT, try clicking on the title bar for the StudentVM-02 window.

Part 2. Adjust Memory Allocation on a Virtual Machine

1. Right-click the StudentVM-02 virtual machine in the Object Navigator inventory and select Shut Down Guest OS.

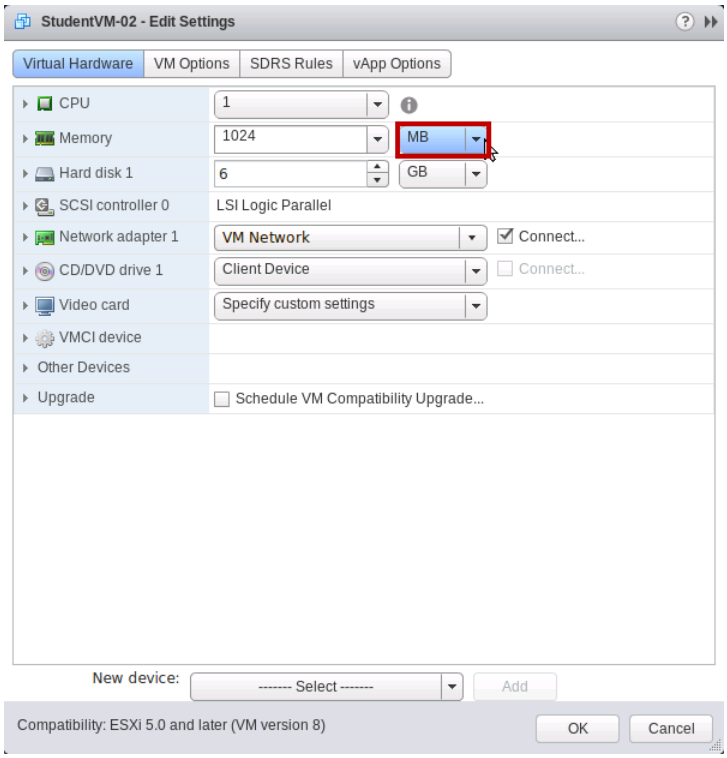


14. After the virtual machine has shut down, right-click StudentVM-02 and select Edit Settings.

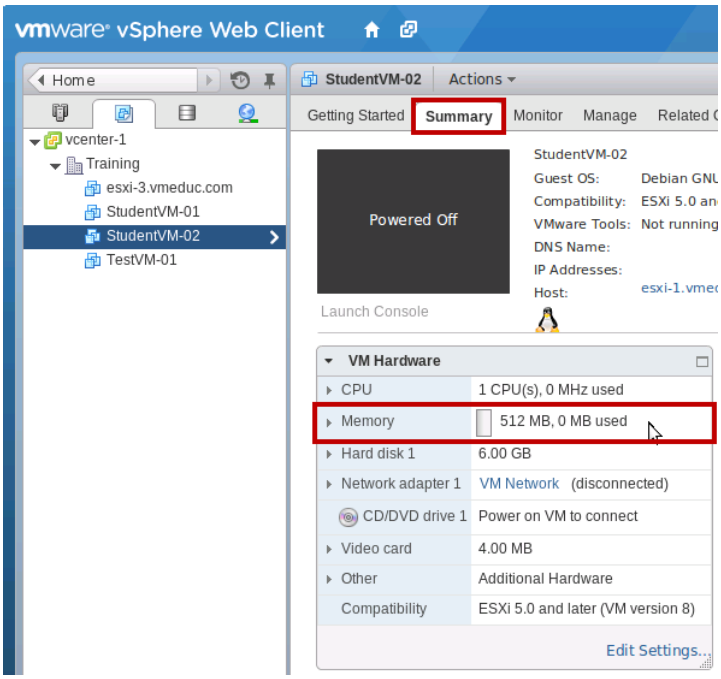


4. Select MB from the drop-down menu in the Memory configuration area of the Virtual Machine's Properties dialog box.

The MB setting is already selected, just confirm that's the case.

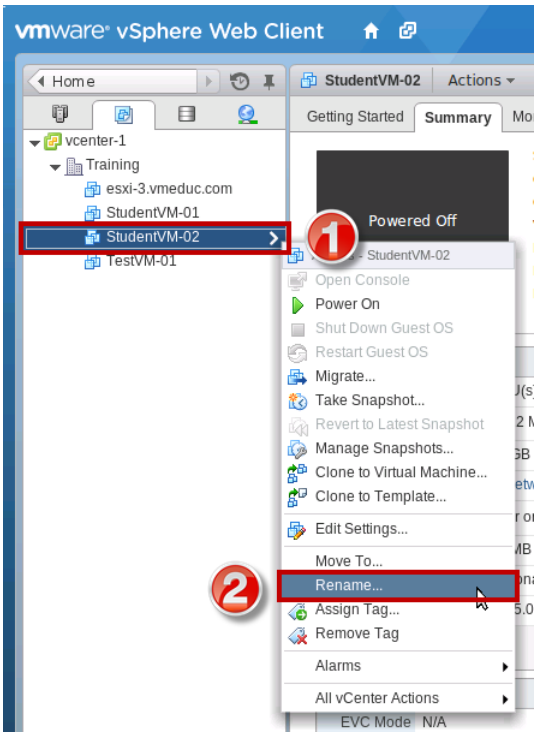


7. Click on the virtual machine's Summary tab to verify that the memory has decreased.



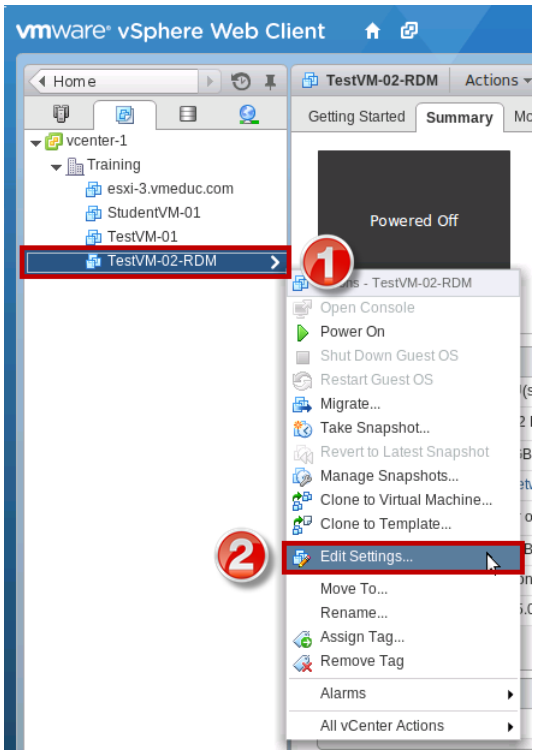
Part 3. Rename a Virtual Machine in the vCenter Server Inventory

1. In the Object Navigator pane, right-click the StudentVM-02 virtual machine and select Rename.

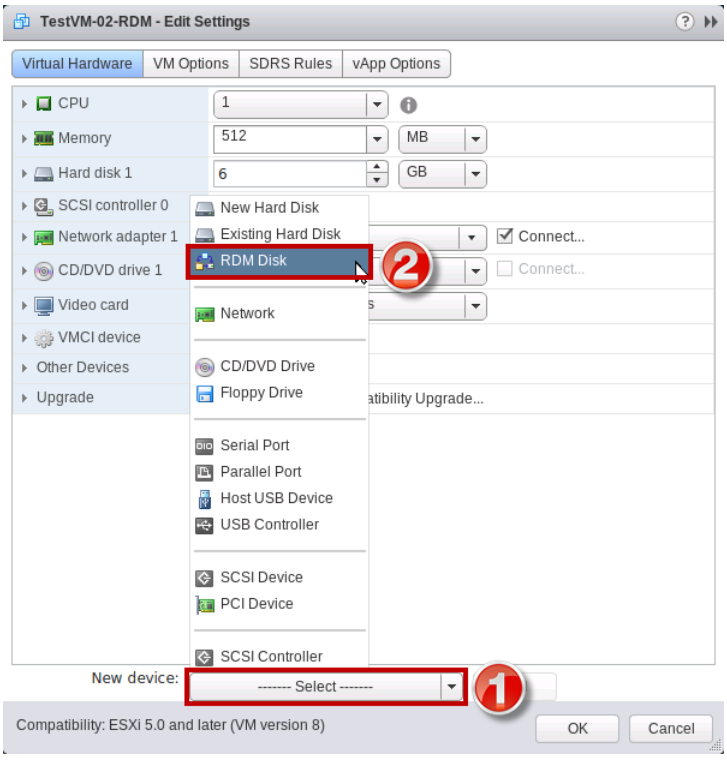


Part 4. Add a Raw LUN to a Virtual Machine and Verify that the Guest OS Can See It

1. In the Object Navigator, right-click the TestVM-02-RDM virtual machine and select Edit Settings.

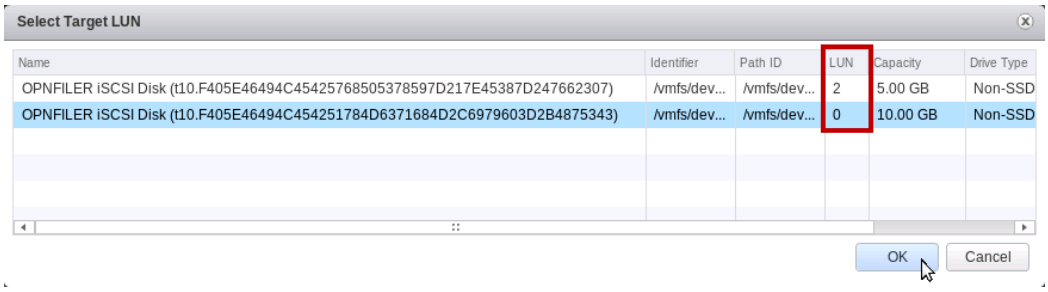


2. At the bottom of the Edit Settings dialog window, select RDM Disk from the drop-down menu and click Add.



3. On the Select Target LUN page, select LUN 0. Click OK.

LUN 0 is the second entry shown in the dialog below.

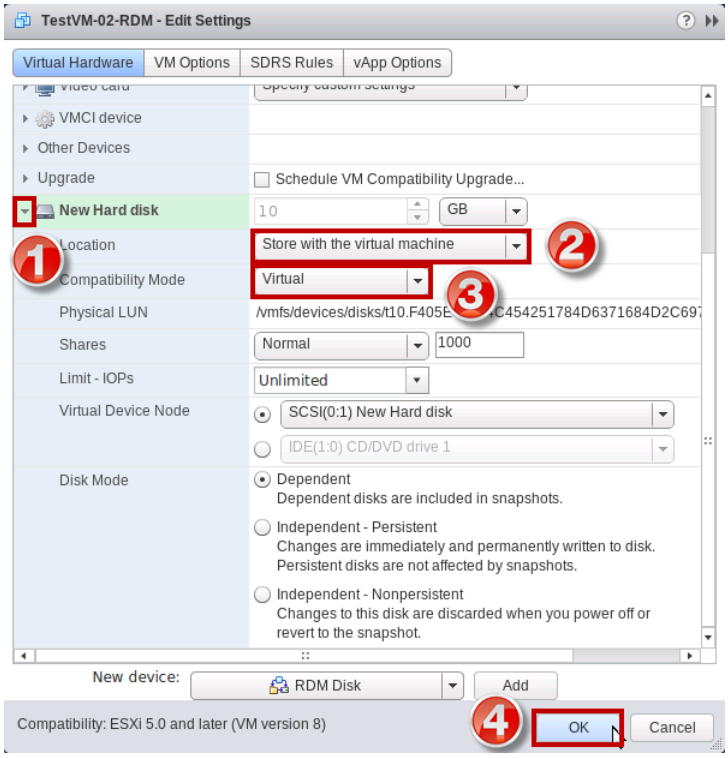


4. Click on the triangle next to the New Hard Disk to expand the view.

5. Verify that the Location is set to Store with the virtual machine.

6. Change the Compatibility Mode entry to Virtual.

7. Leave all other settings at their default and click OK.



8. Power on the TestVM-02-RDM virtual machine, open a console to the virtual machine, and login as user sysadmin with password vmware123.

These steps are a repeat of Part 1, Step 12. Re-examine those steps if you are lost.

19. In order to see if the virtual machine detected the expanded hard drive space, type fdisk –l | grep Disk and press Enter.

Note that this is the minus symbol followed by a lower-case 'L' (not the number 1).

22. You can close the TestVM-02-RDM console window by clicking the X button in the upper-left corner of the window. Note: If the console window disappeared before you could manually close it, you can click the Chrome icon and then select the console window. This should bring the window to the foreground so you can close it.

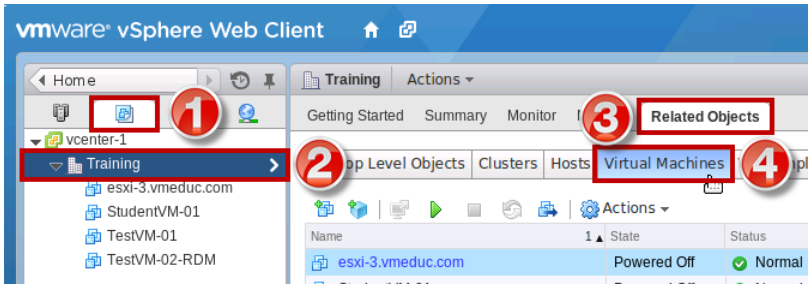
If the system is not responding to your clicking of the **X** button, the most likely cause is that you haven't completed Step 21 properly. Make sure that your window to the vClient is currently selected (in case you clicked outside of the window). Move your mouse into the StudentVM-02 window, then hold down the **CTRL** and **ALT** keys. Move the mouse outside of the StudentVM-02 window, while keeping it inside the vClient window. If you are still having difficulties, while holding CTRL and ALT, try clicking on the title bar for the StudentVM-02 window.

Part 5. Expand a Thin-Provisioned Virtual Disk

1. In the Object Navigator pane, select the VMs and Templates tab.

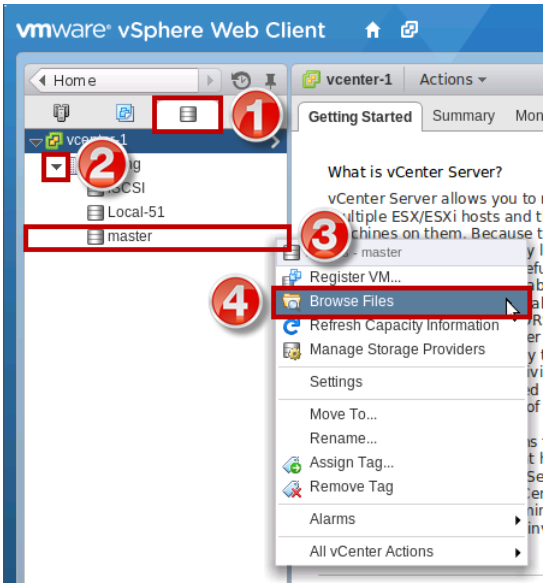
2. Select the Training datacentre in the inventory view.

3. In the main workspace area, click on the Related Objects tab and then click the Virtual Machines button.



7. In the Object Navigator pane, click on the Storage tab.

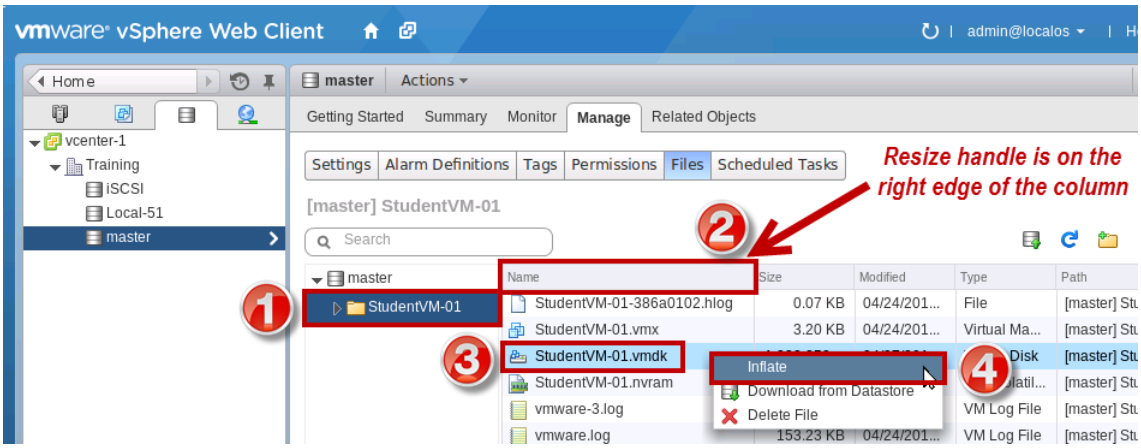
8. Right-click the master datastore in the Object Navigator pane and select Browse Files.



9. In the main workspace, click on the folder named StudentVM-01.

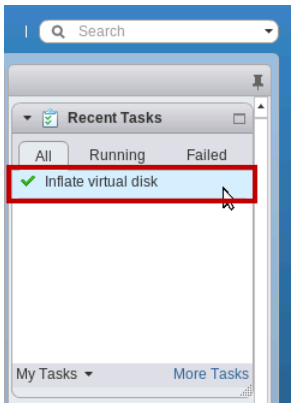
10. Expand the name column until you can see the complete file names.

11. Right-click the StudentVM-01.vmdk file and select Inflate.



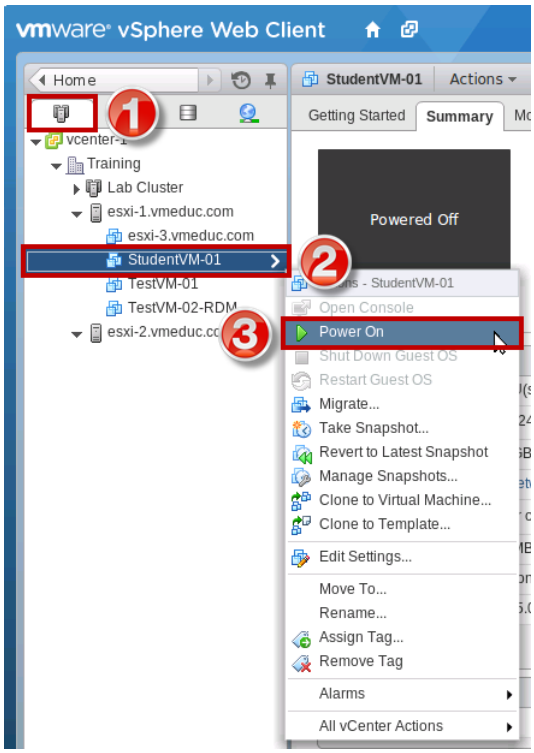
12. This task will take a few minutes to complete.

The progress of this task can be tracked in the Recent Tasks pane at the top-right of the browser window (the tick/check on the image shows the task completed).



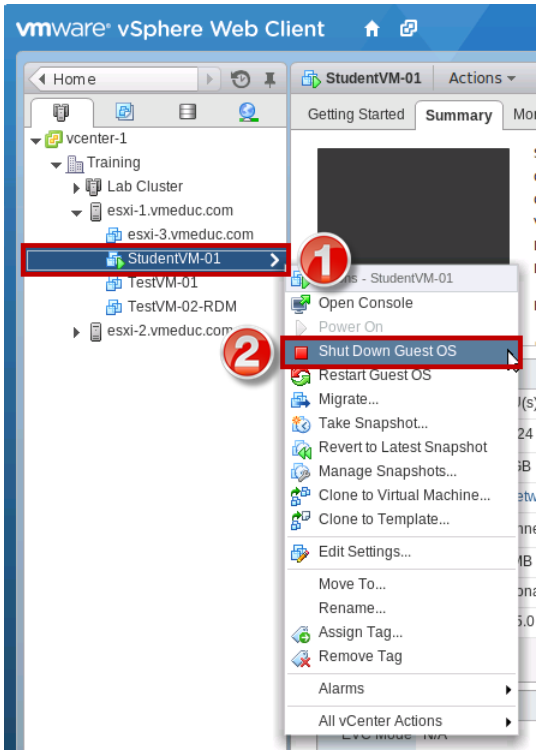
13. In the Object Navigator pane, select the Hosts and Clusters tab.

14. Power On your StudentVM-01 VM.

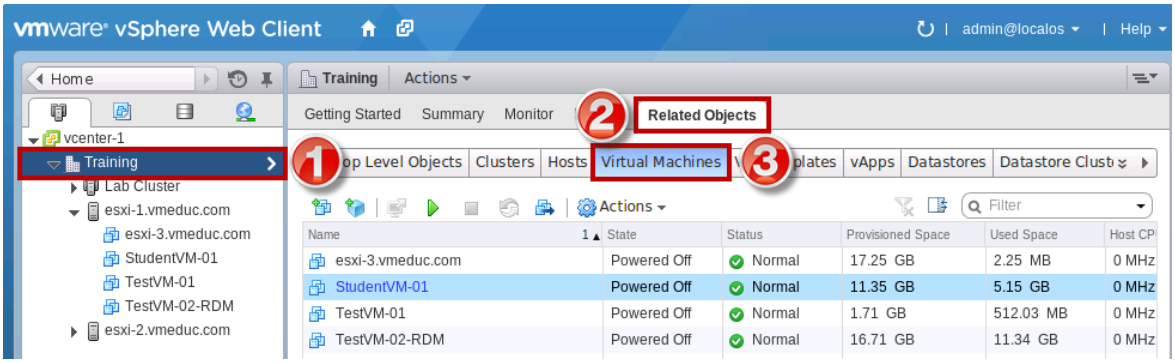


15. When StudentVM-01 finishes booting, right-click it and select Shut Down Guest OS. Click Yes to confirm.

To determine if the VM has finished booting, you can either open the console window and monitor its progress (as described in previous steps for this lab), or you can just wait for a few minutes.



16. Click on the Training datacenter in the Object Navigator pane, click on the Related Objects, and click on Virtual Machines.

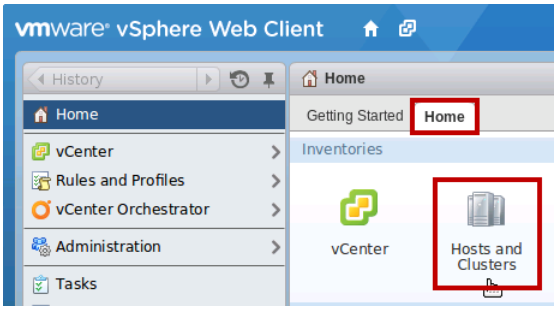


Possible Problems with Lab 13. Migrating Virtual Machines

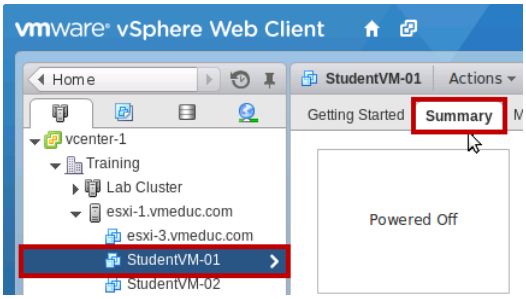
Note that it is not possible to start this lab without starting a new booking. If you have just completed Lab 12, click on the I'M DONE button on the NetLab page, wait a few minutes for NetLab to close your booking, then make a new booking for this lab.

Part 1. Migrate Virtual Machine Files with vSphere Storage vMotion

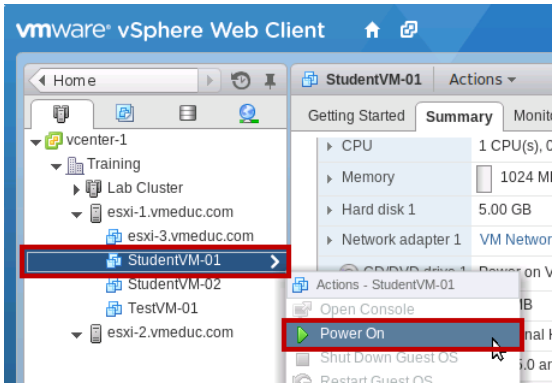
5. On the Home tab, click on the Hosts and Clusters icon in the Inventories section.



6. Select the StudentVM-01 in the Object Navigator pane and then click on the Summary tab.

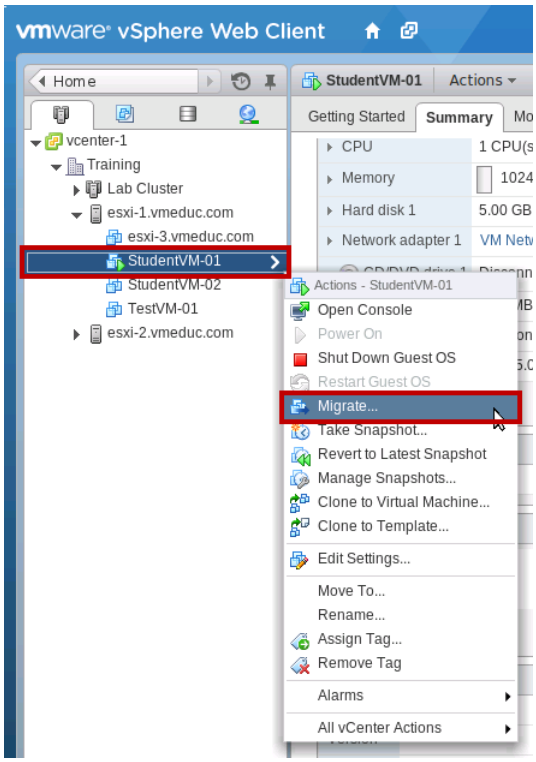


8. Right-click StudentVM-01 in the Object Navigator pane and select Power On.

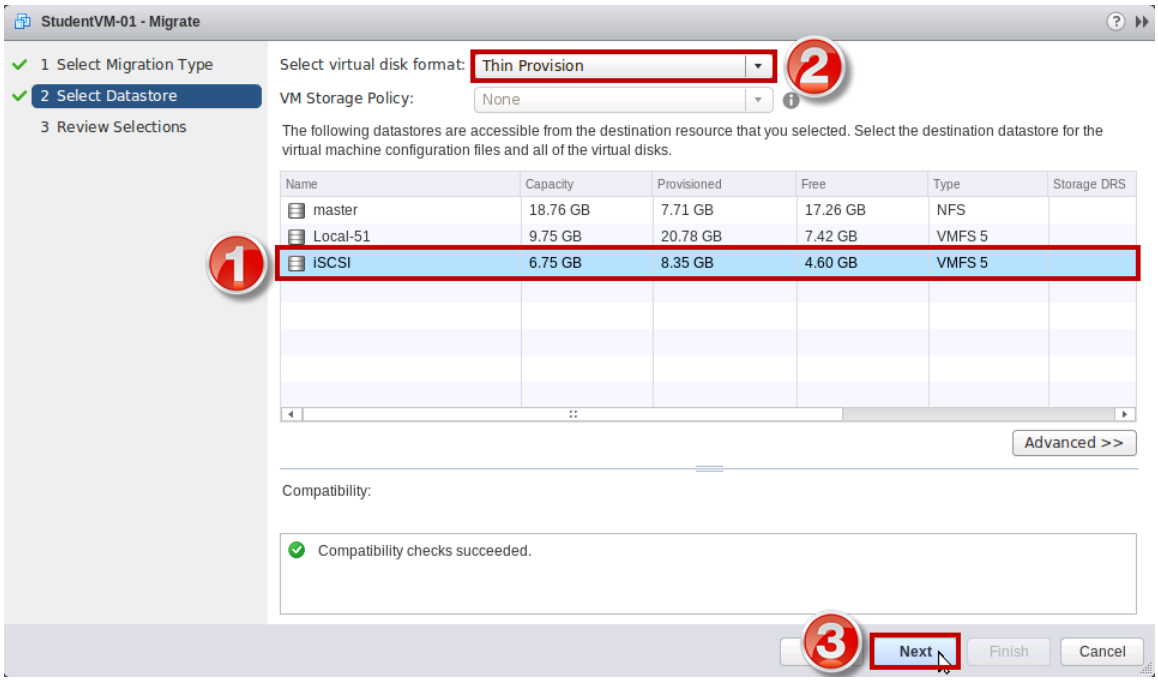


9. Once the VM has powered on, right-click StudentVM-01 and select Migrate.

Check the progress in the Tasks pane at the top-right of the browser window to see if the powering on task is completed.

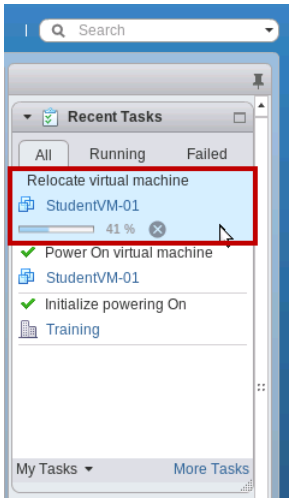


13. Select iSCSI for the datastore, then Thin Provision for the Select virtual disk format and then click Next.



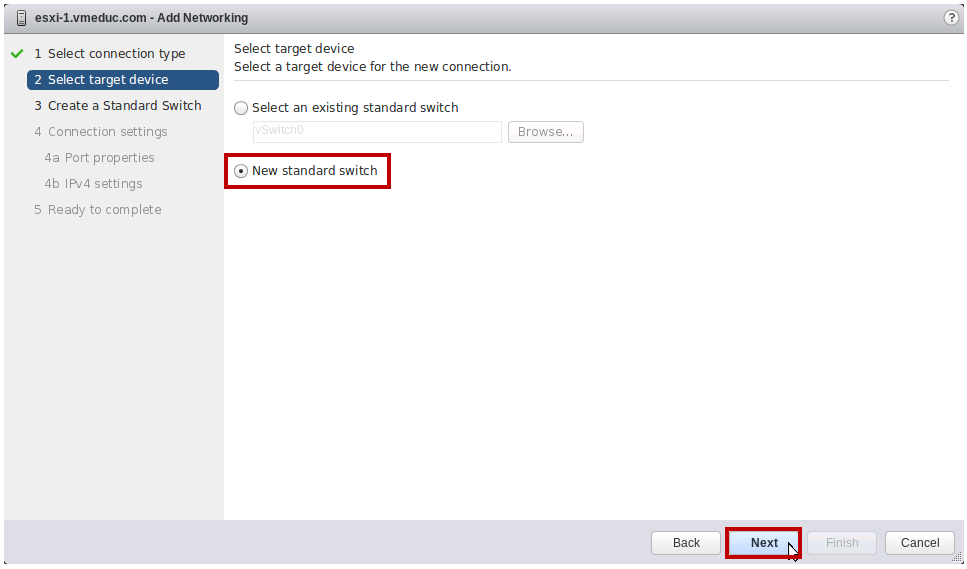
15. On the Summary page of your StudentVM-01 virtual machine, notice that the VM now resides on the iSCSI datastore.

Note that you need to wait for the migration task to complete first. The progress of this task can be tracked in the Recent Tasks pane at the top-right of the browser window.

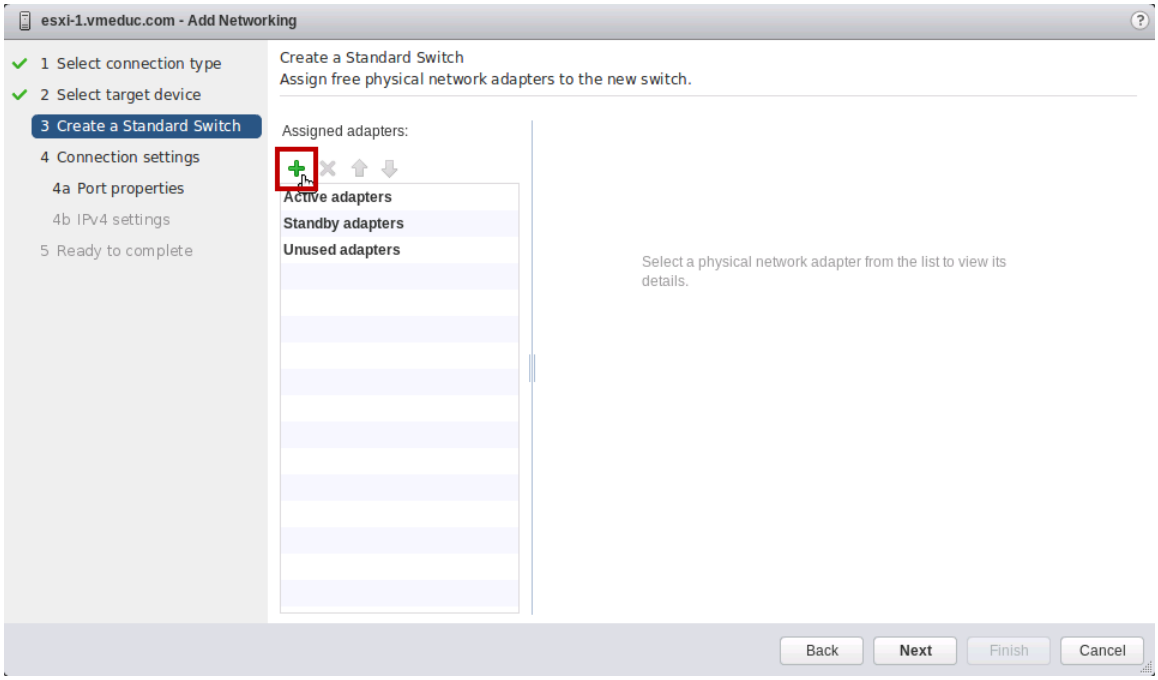


Part 2. Create a VMkernel Port Group for vMotion Migration

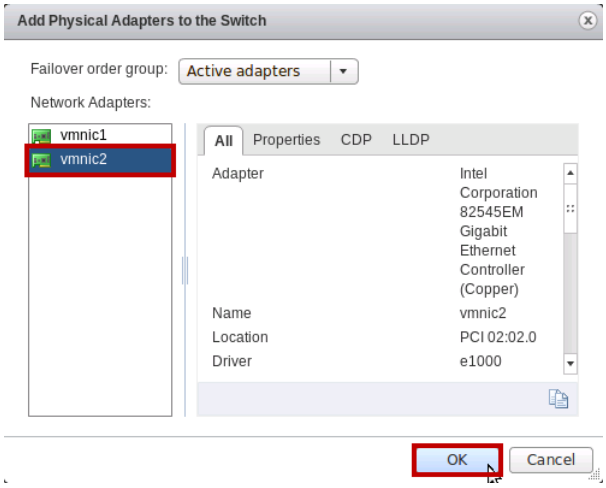
5. On the Select target device page, select New standard switch and click Next.

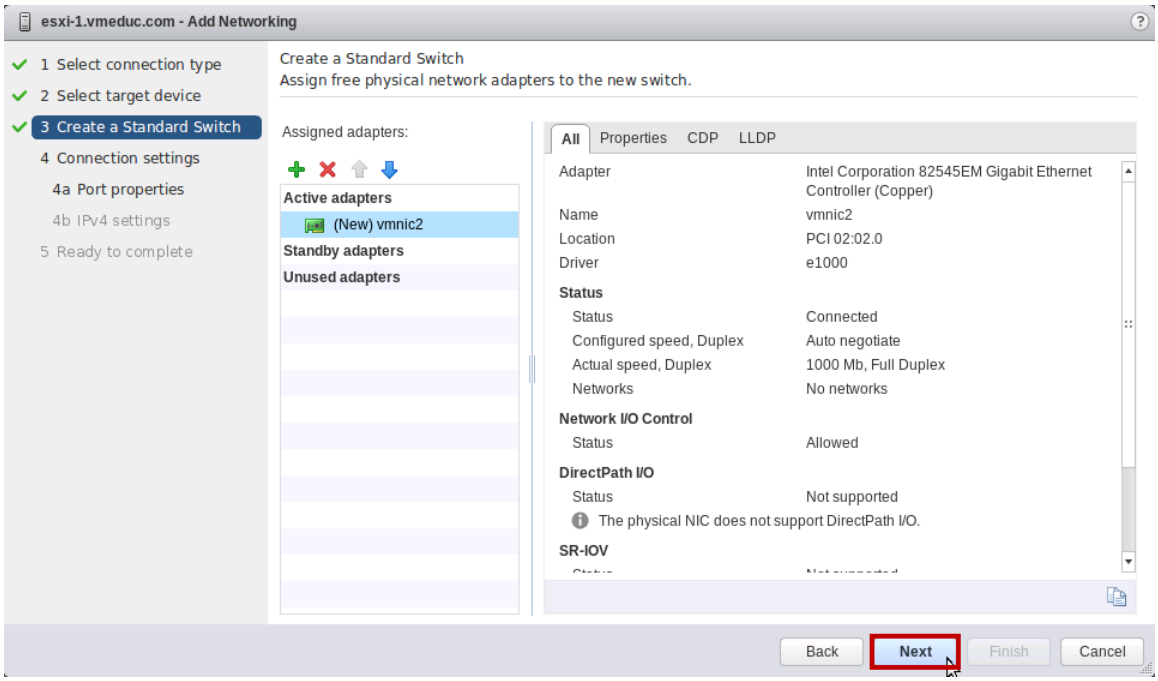


6. On the Create a Standard Switch page, click the plus sign.

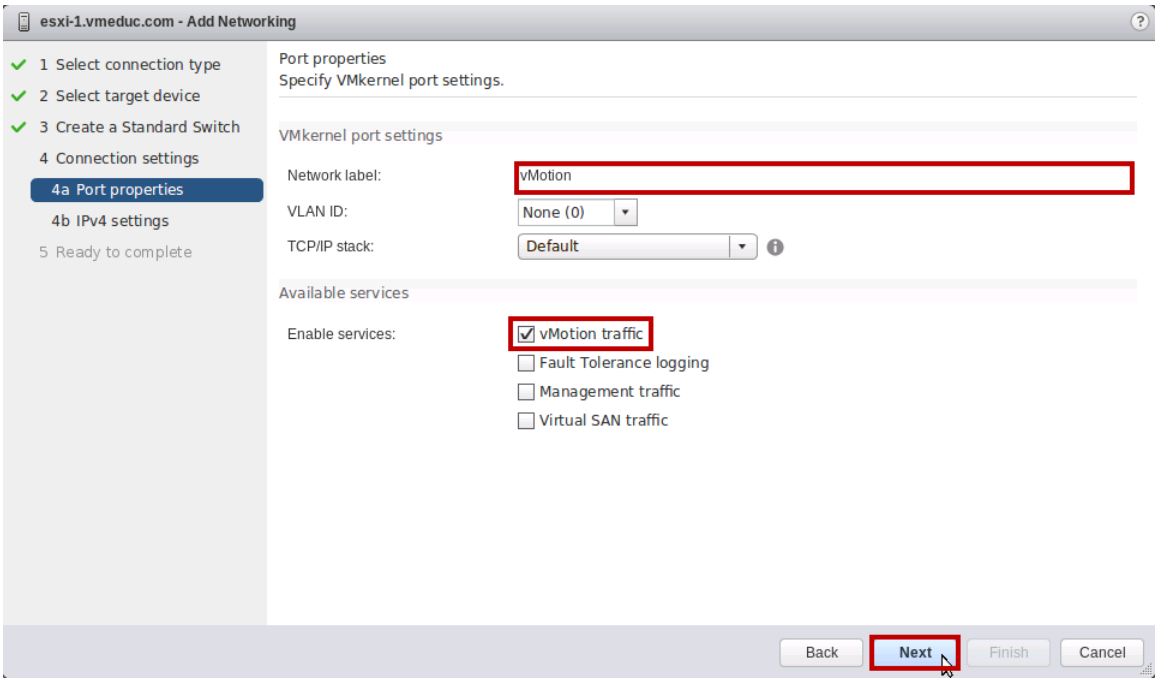


7. Select vmnic2, click OK and then click Next.

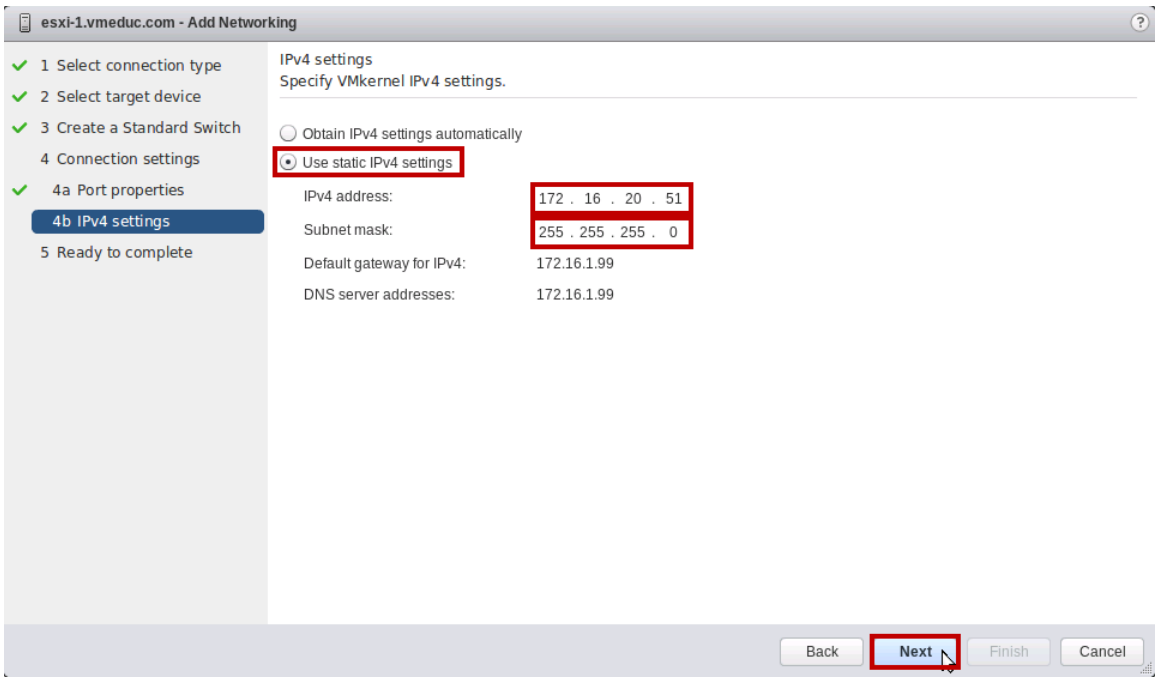




8. On the Port properties page, type vMotion in the Network Label box, mark the vMotion traffic check box and click Next.

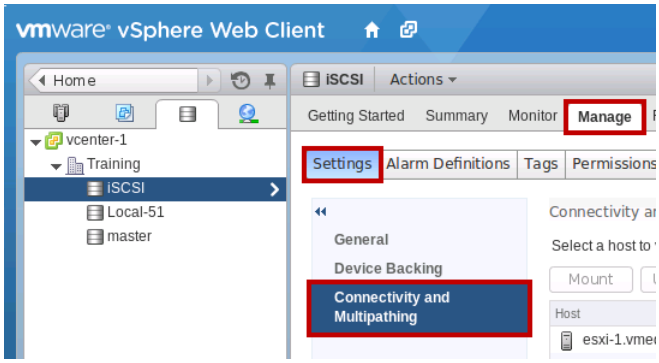


9. On the IPv4 Settings page, select the Use static IPv4 settings radio button and enter the following and click Next:



4c. Click on the Manage tab and then click on the Settings button .

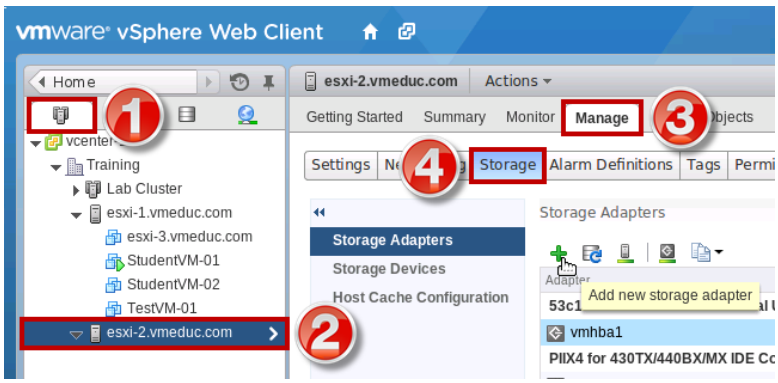
4d. Select Connectivity and Multipathing. If your esxi-2 host is not listed, proceed to Step 5. If your esxi-2 host is listed, skip to Step 6.



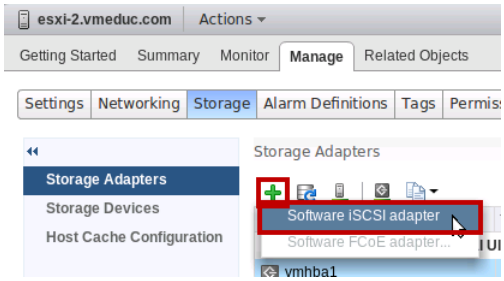
5. In order to remedy the situation, you must add the iSCSI Software Adapter to esxi-2 and add the san VM as a target. Hint: Click on esxi-2 in the inventory, get to the Manage tab and the Storage page, and then "add" the adapter. Set the Target to 172.16.1.99 with the default port of 3260 and then rescan the adapter. Return to Step 4b.

This is a very complicated instruction which is shown with step-by-step instructions, as follows.

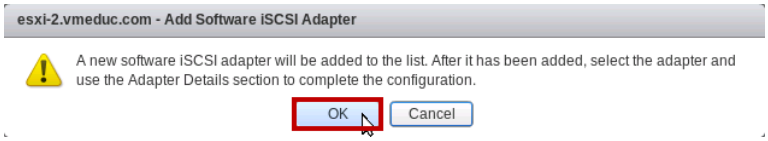
Start by clicking on the **Hosts and Clusters** button in the Object Navigator pane. Select the **esxi-2.vmeduc.com** entry, then the **Manage** tab, and finally on the **Storage** page.



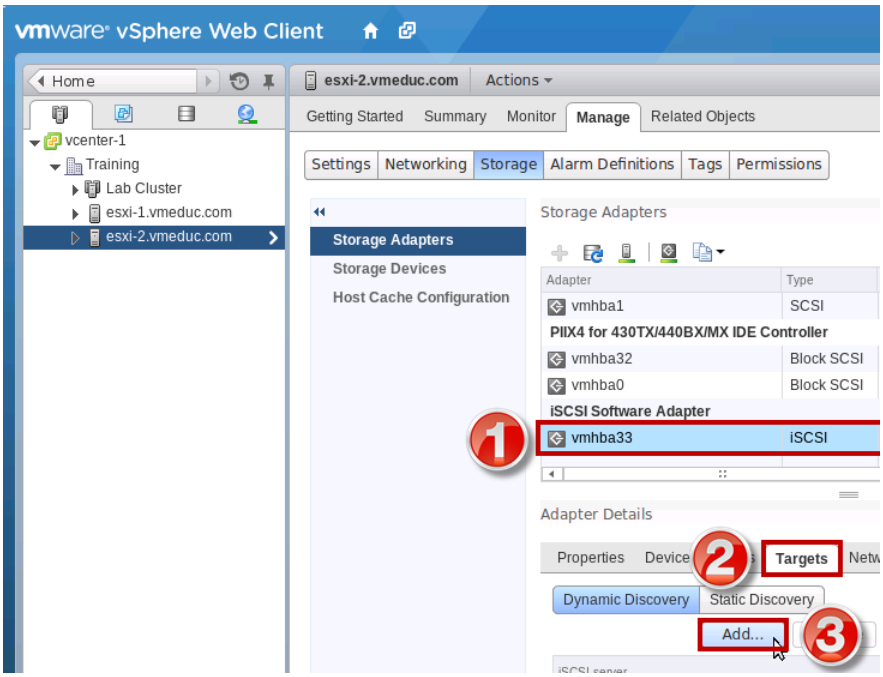
Click on the **plus** button to add an adapter, then select **Software iSCSI adapter**.



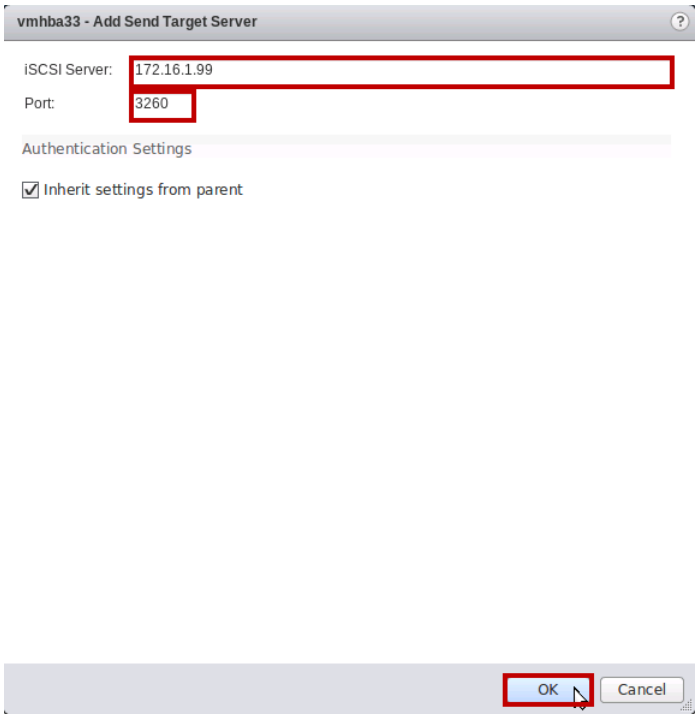
Click **OK** to confirm creation of the adapter.



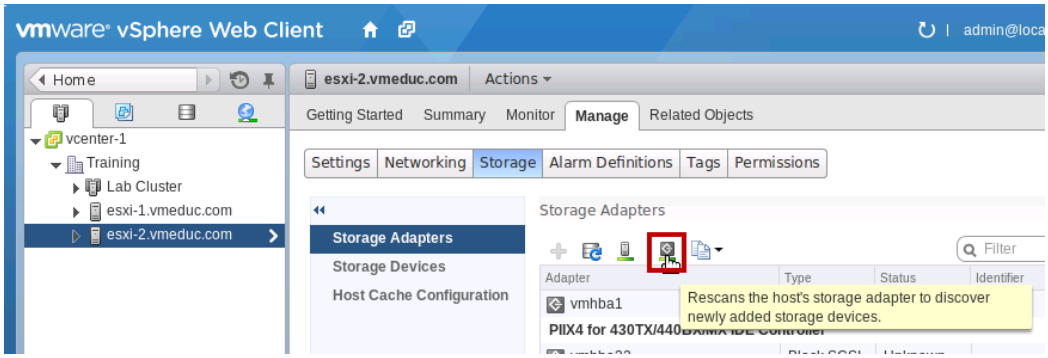
This will take a moment to complete, then you can configure the target for the adapter by clicking on the **vmhba33** adapter, selecting the **Targets** tab, then click on the **Add...** button.



For the **iSCSI Server**, enter the IP address of **172.16.1.99**, confirm that the **Port** is set to **3260**, and finally click the **OK** button.



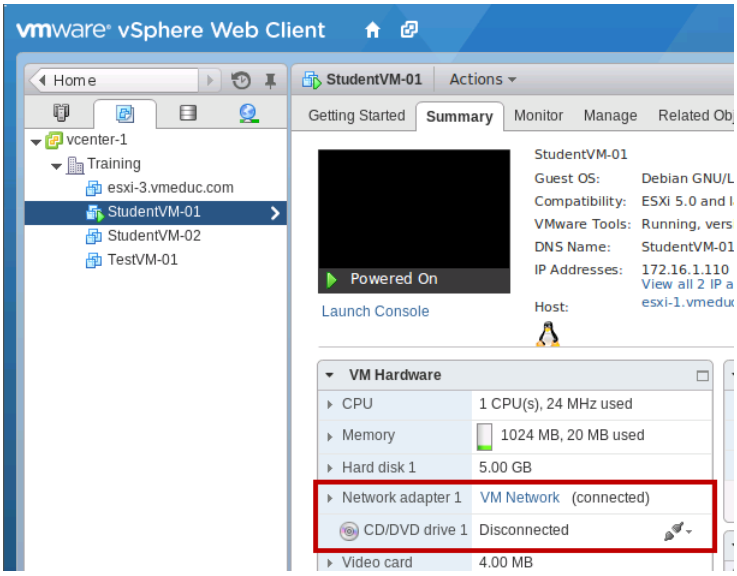
Perform a rescan of the storage adapters by clicking on the **rescan button**.



Part 4. Verify that Your Virtual Machine Meets vMotion Requirements

3. Locate CD/DVD Drive 1 in the VM Hardware list and verify that the column shows Disconnected.

4. Locate Network Adapter 1 in the VM Hardware list and verify that virtual machine is connected to the VM Network network.



Part 5. Perform a vSphere vMotion Migration of a VM on a Shared Datastore

1. Click on the Hosts and Clusters tab in the Object Navigator pane.

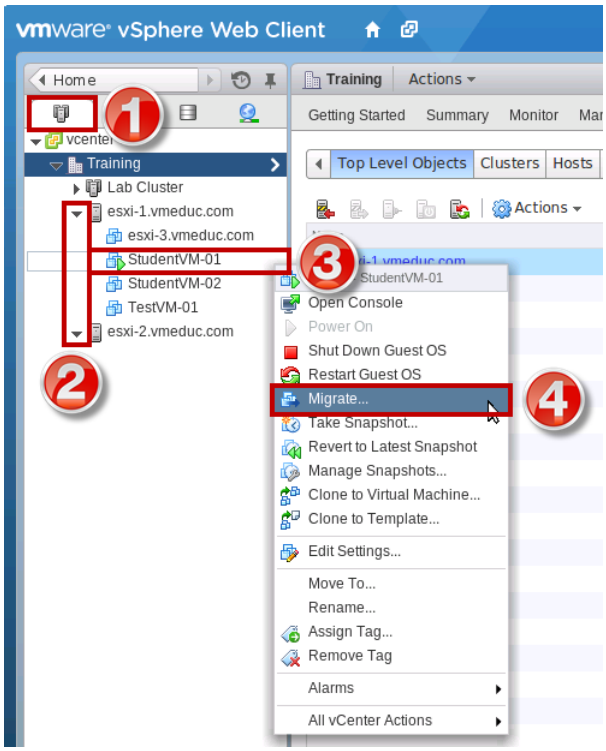
2. In the Object Navigator pane, verify that you can see all of your virtual machines.

-- Make sure the triangles are pointing down as shown in the image.

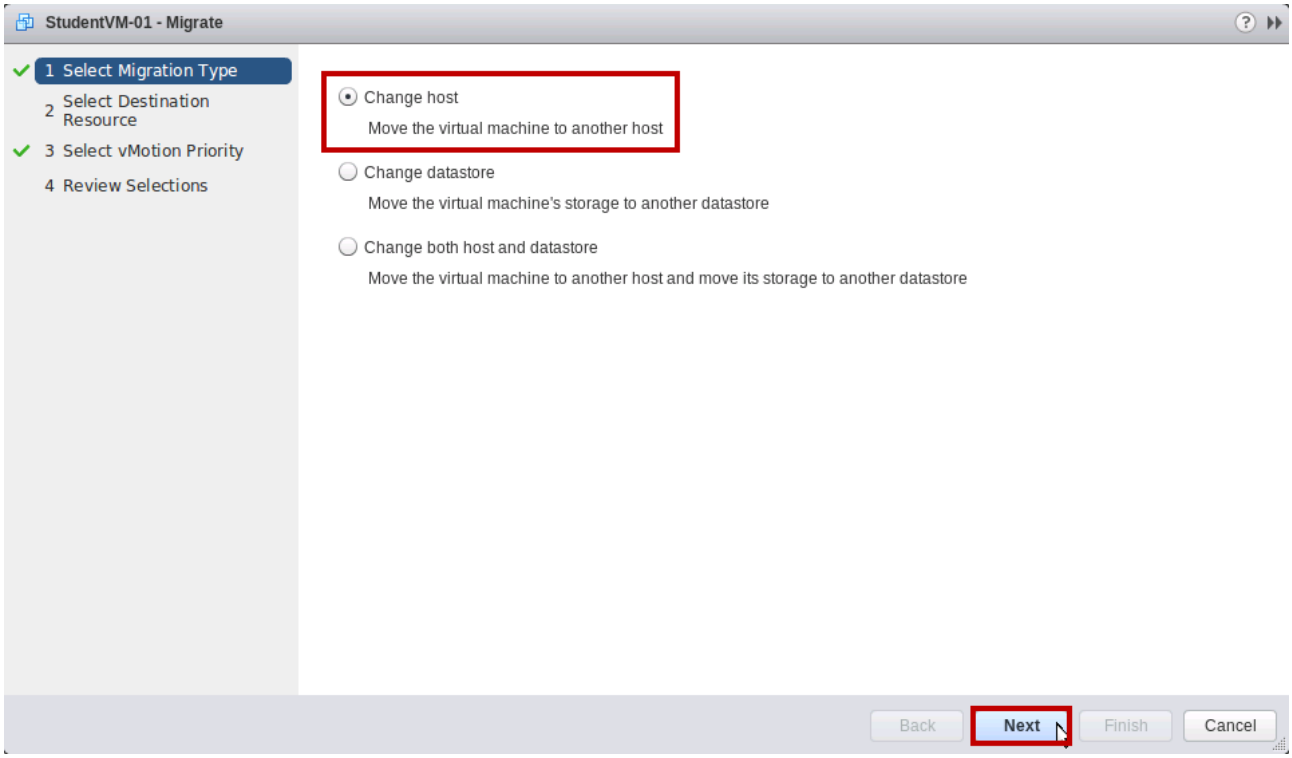
3. Right-click the StudentVM-01 virtual machine and power it on if it is not powered on already.

-- Note that the VM should still be powered on from earlier in the lab!

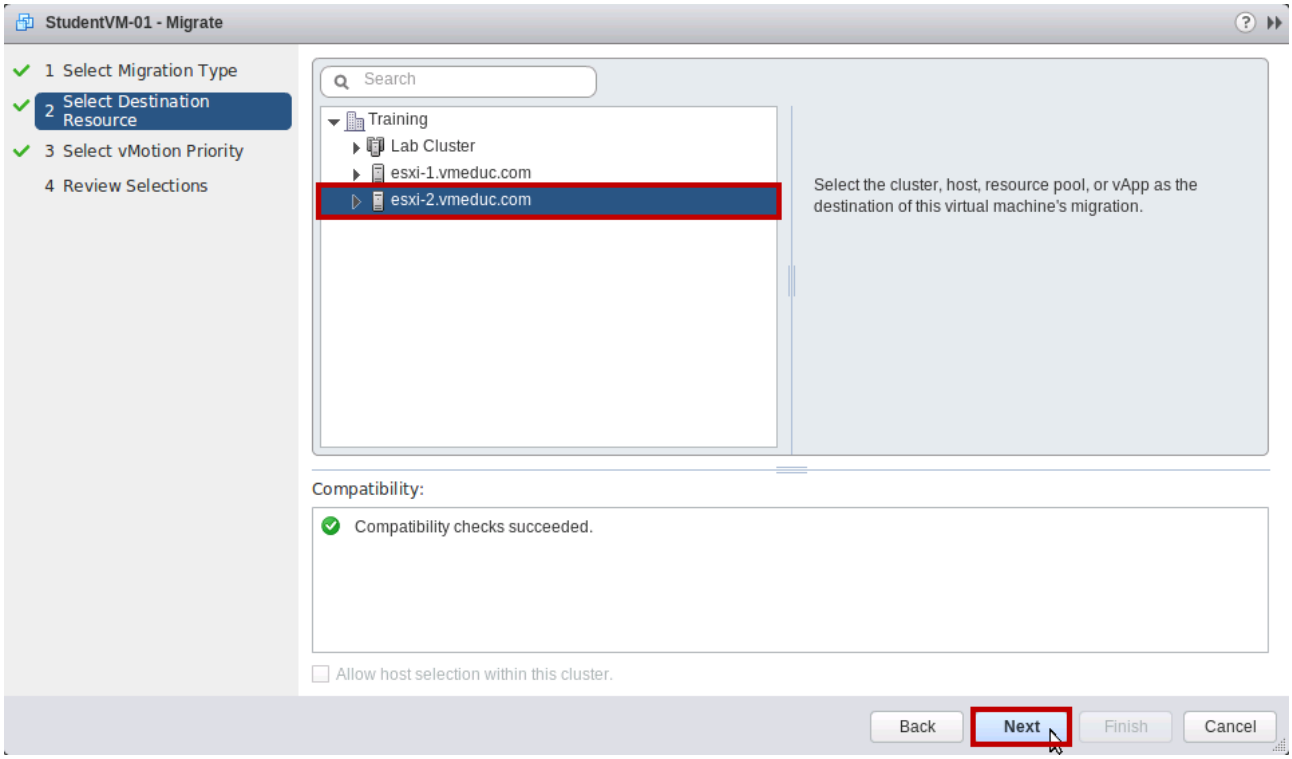
4. When the task completes, right-click the StudentVM-01 virtual machine and select Migrate.



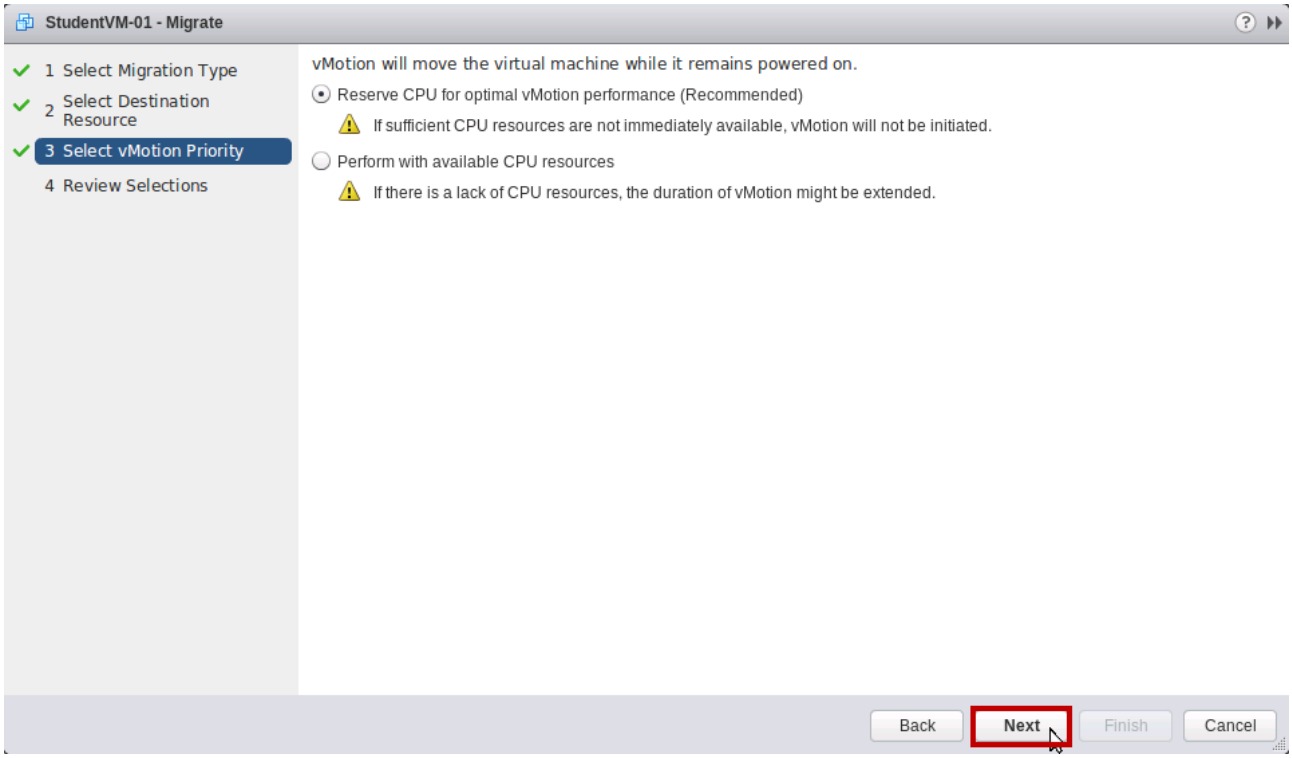
5. On the Select Migration Type page, select Change Host and click Next.



6. On the Select Destination Resource page, select esxi-2.vmeduc.com and click Next.



7. On the Select vMotion Priority page, leave the default selected and click Next.



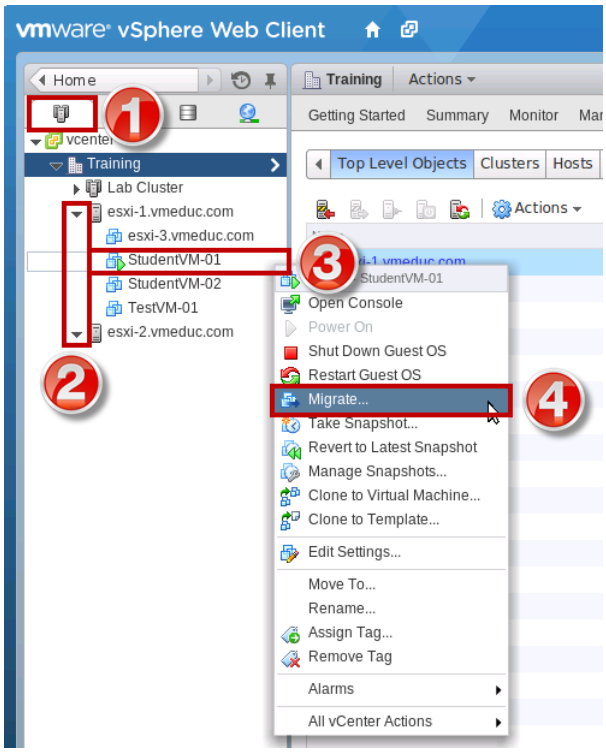
Part 6. Perform a vSphere vMotion Migration to a Local Datastore

1. Click on the Hosts and Clusters tab in the Object Navigator pane.

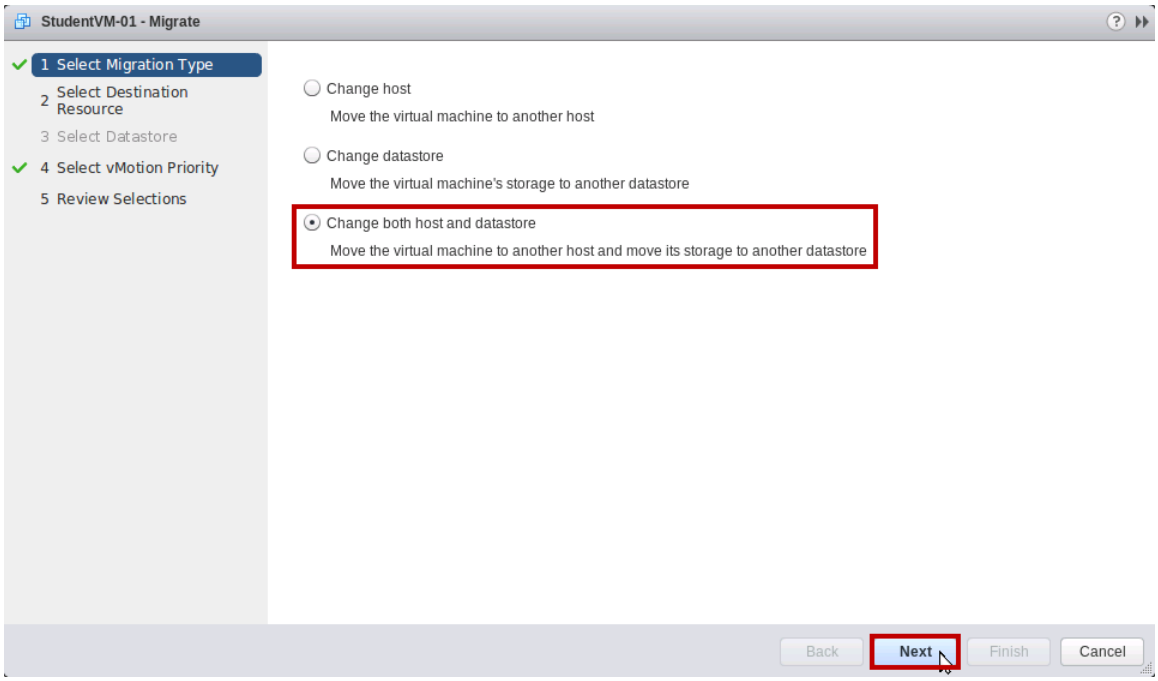
2. In the Object Navigator pane, verify that you can see all of your virtual machines.

-- Make sure the triangles are pointing down as shown in the image.

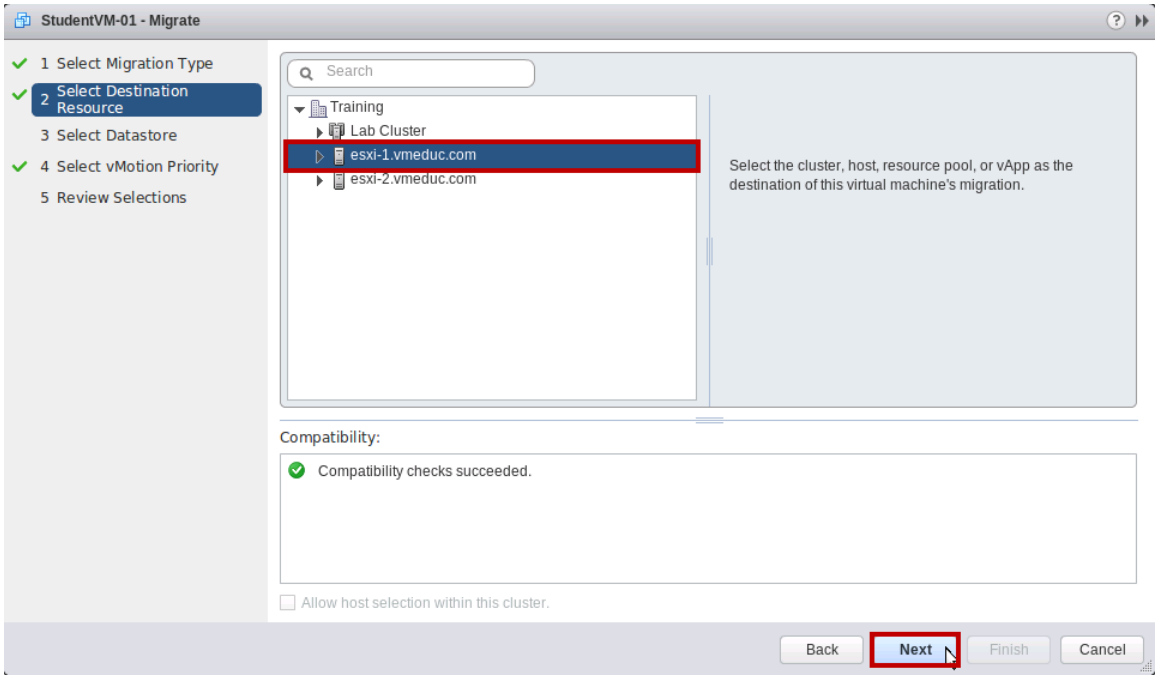
3. Right-click the StudentVM-01 virtual machine and select Migrate.



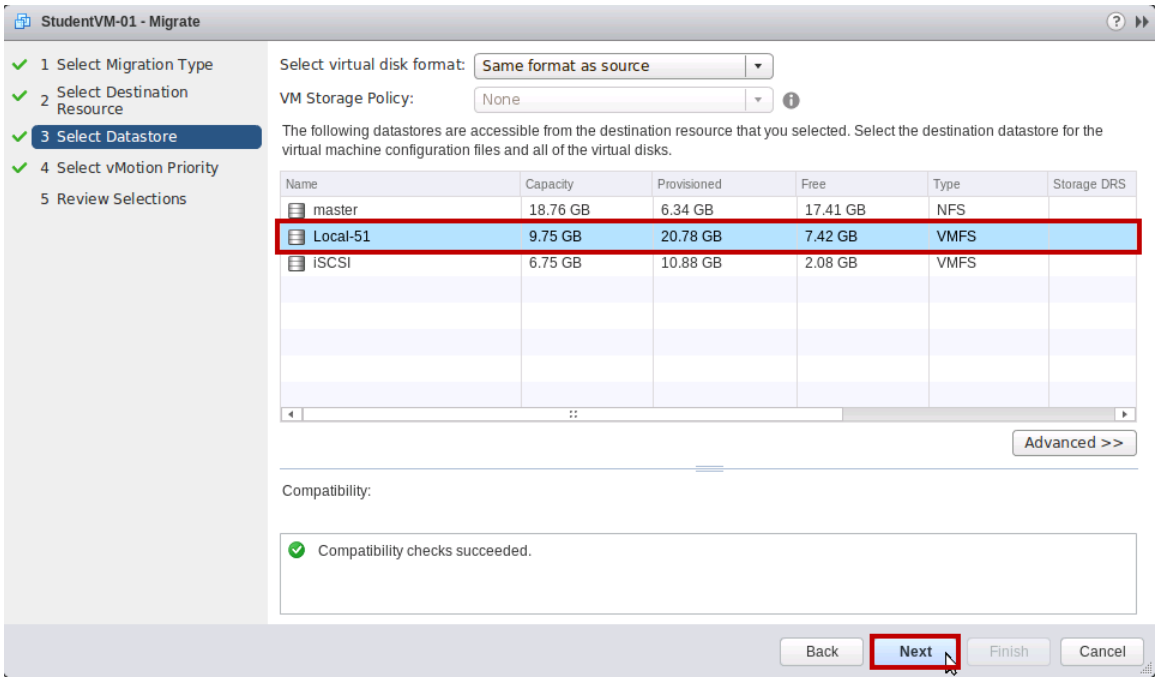
4. On the Select Migration Type page, select Change both host and datastore and click Next.



5. On the Select Destination Resource page, select esxi-1.vmeduc.com and click Next.



6. On the Select Datastore page, select Local-51 and wait for the validation to finish. Click Next.



7. On the Select vMotion Priority page, leave the default selected and click Next.