Chapter 8

Working with VMware vCenter Server

While this chapter in the Hands-on Virtual Computing book focuses on vCenter Server and its many features including clustering, load balancing, fault tolerance, and vMotion, the first three activities work with the free vSphere ESXi hypervisor. For that reason, initially I have included only the first three activities in the initial rewrite. The vCenter activities, which require a trial license, will be added in the near future.

In activities 8-1 through 8-3, you will install a second vSphere Host, configure the management network, create a local datastore, and then create a virtual machine and install Window 10. You will then create a NAS storage area on your Windows Server 2019 system and use it to share the virtual machine between the two hosts. In the last activity you will get a chance to setup an iSCSI initiator to connect to the SAN storage area you setup in Activity 4-3. At the end of this chapter, you will have free vSphere virtualized data center that you can use for installing vCenter Server as well as learning about other VMware products in the future.

Activity 8-1: Installing NFS File Sharing on Windows Server 2019 Virtual Machine

Time Required: 15 minutes

Objectives: Add an NFS file server role to YOUR Windows Server 2019 and then use it to share a directory on the virtual network.

Requirements: Completion of Chapter 4, Activity 4-3. Your Windows Server 2019 should have a fixed IP address on your NAT network as described in Chapter 4, Activity 4-3.

Description: In this activity you will install the NFS server on a Windows Server 2019 virtual machine and use it to share a directory on the network for both your UAS Hosts.

1. If necessary, open VMware Workstation 12 Player and click to select your Windows Server 2019 VM you created in Chapter 4.
2. Start Windows Server VM and then log on as Administrator.
3. Open File Explorer and click on **This PC.** Verify that you have at least 90 GB free on one of the drives and record the drive letter for later reference.
4. If necessary, start Server Manager application, click the **Add roles and features** link, and click **Next** to display the "Before you begin" window. Read the instructions and click **Next** to continue.
5. Verify that the **Role-based or feature-based installation** option is selected and click **Next** to display the "Select destination server" window. Follow the instructions below to add the NAS server role to your Windows Server 2019.
   a. Verify that your Windows Server 2019 is selected and **record the IP_address.** You will need to use this IP_address later to connect to the NAS.

   Record IP address information for future use.

   b. Click **Next** to display the "Select server roles" window.
   c. Click to expand the **File and Storage Services** and **File and iSCSI Services** links.
   d. Click to place a check in the **Server for NFS** option to display the "Add Roles and Features" wizard.
   e. Verify that the "Include management tools (if applicable)" option is selected and then click the **Add Features** button to return to the "Select server roles" window.
   f. Click **Next twice** to display the "Confirm installation selections" window.
   g. Confirm your selections and click **Install** to perform the feature installation. Monitor the progress of your installation on the Feature installation progress bar.
   h. Wait until you see "Installation succeeded on your_server_name" and then click **Close** to return to the Server Manager dashboard. You can now close Server Manager.
6. Follow the steps below to create a SharedVMs folder and then share it using NFS.
   a. If necessary, start File Explore and create a folder named "NASSharedVMs" on the drive you recorded in step 3.
   b. Right-click the **NASSharedVMs** folder and then click Properties to display the Properties window.
   c. Click the **NFS Sharing** tab and then click the **Manage NFS Sharing** button to display the "NFS Sharing" window.
   d. Click the **Share this folder** option to display an "NFS advanced Sharing" window similar to the one shown in Figure 7-5.

FIGURE 7-5

e. Click the **Permissions** button to display the "NFS Share Permissions" window.
f. Change the Type of access to Read-Write and then click to put a check in the **Allow root access** check box as it is necessary to allow the ESXi host to access the share as the root or administrative user.
g. Click **OK** to save your changes and return to the "NFS Advanced Sharing" window. Click **OK** again to save your changes and return to the "SharedVMs Properties" window.
i. Click **Close** and then close File Explorer. You can leave your virtual machines open for the next activity.

You have now created an NAS shared storage area for use with the UAS vSphere hosts. You may leave your Windows Server 2019 virtual machine open for the next activity in which you will configure your ESXi hosts to share this datastore.

Activity 8-2: Connecting your ESXi Hosts to the NAS Storage area

Time Required: 15 minutes

Objectives: Create datastores on your ESXi hosts that access the shared NFS folder.

Requirements: Completion of Activity 8-1.

Description: After setting up a NFS device on your network, the next step is to create Datastores on the ESXi hosts that can access this storage space to share files and virtual machine. In this activity you will create new Datastores on your UAS-Host1 and UAS-Host2 machines to access the shared NFS storage are.

1. If necessary, open VMware Workstation Player and click to select your Windows Server 2019 VM you created in Chapter 4. Start Windows Server VM and then log on as Administrator.
2. Open a second instance of VMware Workstation Player and start your UAS-Host1 virtual machine.
3. Open a third instance of VMware Workstation Player and start your UAS-Host2 virtual machine.
4. Wait for both hosts to start.
5. Perform the following procedure to create a new Datastore on UAS-Host1 that is mounted to the Windows Server 2019 NAS.
   a. If necessary open your Web browser and enter the ip_address of your UAS-vHost1 host and login to your server using your "root" username and password.
   b. From the left-hand Navigator pane, click on the Storage link to display the Datastores tab.
   c. Click the New Datastore option from the menu bar to start the New datastore wizard.
   d. Click the Mount NFS datastore option from the Select creation type pane and click **Next** to display the "Provide NFS mount details" window as shown in Figure 7-6.

FIGURE 7-6

e. In the Name field, enter "**NAS Shared VMs**" (or whatever name you want).
f. In the "NFS server" field, enter the **IP_Address** of the Windows Server 2019 machine you recorded in Activity 8-1.
g. In the "NFS share" field, enter the name you used (SharedVMs) for the NFS share in Activity 8-1.
h. Click the **NFS 4** option.
i. In the "Username" field, enter "Administrator" and then enter your administrator password in the "Password" field and click **Next** to display the "Ready to complete" screen.
j. Verify your entries and click **Finish to** create the datastore. The datastore should now appear in the Datastore tab.

Notice that the drive type says "Unknown." This is because the NFS server takes care of the storage formatting. When the ESXi host makes requests for data, the NAS server will process the request and get the data using its own internal disk format. When working with a local or iSCSI drive, the ESXi host will use its own VMFS disk access to format and retrieve the data. Sing VMFS provides advantages such as improved performance, fault tolerance, and virtual machine migration.

6. Perform the following procedure to create a shared storage area using the iSCSI Target you created in chapter 3.
   a. Click to select **Storage** from the left-hand Navigator pane.
   b. Click the **Adapters** tab.
   c. If necessary, scroll down and click the vmhba## adapter (this is used for iSCSI connections).
   d. Click the **Software iSCSI** tab from the top menu bar to display the "Configure iSCSI vmba##" window.
   e. From the left-hand pane, click to select "Use CHAP" after the CHAP authentication.
   f. Click the arrow to the left of CHAP authentication heading to display the pull-down menu.
   g. Enter the user name and "secret" password (see the information you recorded in Activity 4-3) in the Name and Secret fields. (Remember, I told you to record the information.)
   h. Click the **Save Configuration** button.
   i. Return to the Storage window.
   j. Click **New Datastore** to display the New datastore window and then click to select **Create new VMFS datastore** and click **Next**.
   k. Enter a name "iSCSI SAN Storage", click to select the iSCSI storage area and click **Next**.
   l. When you see the "Select partitioning options" window, click **Next** to use the full disk.
   m. Click **Finish** to create the new iSCSI datastore and add it to the Datastore window.
7. Repeat the process from step 5 and 6 to create a shared datastores on your UAS-Host2 system.

This completes Activity 8-2. You may leave your virtual machines running and your browser open for the next activity.

Activity 8-3: Moving and running an Existing Virtual Machine on the shared datastore

Time Required: 20 minutes

Objectives: Move your existing Windows 10 virtual machine to the NFS datastore and access it from either ESXi host.

Requirements: Completion of Activity 8-2.

Description: Now that you have both your ESXi hosts connected to your Windows Server 2019 NAS storage device, the next step is to learn how to move a virtual machine to the shared storage, so it is accessible to multiple hosts. This is important to allow the virtual machine to continue to run while maintenance is performed on the UAS-Host1 system. In this activity you will use the vSphere Client to move your UASWindows10VM1 virtual machine to the shared NAS device and then run the virtual machine from UAS-Host2.

1. If necessary, perform the following steps to start the required virtual machines. (You can skip this step if you left your virtual machines running from Activity 8-2)
   a. Open an instance of VMware Workstation Player and start your Windows Server 2019 virtual machine.
   b. Open another instance of VMware Workstation Player and start your UAS-Host1.
   c. Open a 3rd instance and start UAS-Host2.
   d. After all hosts are up and running, open a browser tab for each of your ESXi hosts and login as root to each of the hosts.
2. Follow the steps below to move your UASWindows10VM1 files to the NAS shared drive.
   a. Go to the ESXi host (UAS-Host1) and click the **Storage option** from the left-hand Navigator pane.
   b. Click the Datastore containing your virtual machine files.
   c. Click **Datastore browser**.
   d. Right-click the folder containing the UASWindows10VM1 files and click **Move to** display the "Select Destination" window.
   e. Click to select the "Shared VMs" datastore and then click **Move**.
   f. Close the Datastore browser window.
   g. Monitor the "Move destination file" progress in the "Recent Tasks" pane at the bottom of the VMware Host Client window. This will take several minutes so it is a good time for a break.

   The task bar may stop advancing making it hard to know when the move is completed. It your task bar goes past 60% and does not move after several minutes you may want to restart your browser and log back in to UAS-Host1. If the task is no longer showing, you can assume the move is complete.

3. After the move is complete, you can remove the UASWorkstationVM1 from the list of virtual machines by performing the following procedure:
   a. Click on the virtual machine to be removed.
   b. Click on the **Actions** options to display a pull-down menu.
   c. Click **Unregister** and then click **Yes** when you see the "Confirmation" dialog box.
   d. The virtual machine will be removed from the list.
4. You can now add the virtual machine, now in its new location, back to the Virtual Machines list by performing the following procedure:

a. Click the **Create/Register VM** link to display the "Select creation type" window.
b. Click the **Register an existing virtual machine** option and then click **Next** to display the Select VMs for registration window.
c. Click in the "Select one or more virtual machines, a datastore, or a directory: box to display the datastore browser window.
d. Click your "Shared VMs" datastore to show all the directories.
e. Click the directory containing your virtual machine files (the one you moved in step 2) to show all the VM files.
f. Click on the "**VirtualMachineName".vmx"** file and then click the **Select** button to select the file and return to the "Select VMs for registration" window.
g. Click to place a check mark in the **VMX file** check box and then click **Next** to display the "Ready to complete" window.
h. Review the entries and then click the **Finish** button to complete the task and add the Windows 10 virtual machine to your Virtual Machines window.

5. Test your virtual machine.
   a. Click to select the **Windows 10 VM** and click the **Power on** option.
   b. When you see the "Answer question" dialog box, click to select the **I Moved it** option and then click **Answer**.
   c. Login to Windows 10 to verify its operation.
   d. After you have checked out the VM running from the shared datastore, power down the Windows 10 VM before proceeding to the next step.
6. In the following procedure you will practice manual fault tolerance. Assume that UAS-Host1 is down, and Universal AeroSpace needs to run the Windows 10 virtual machine while they service UAS-Host1. Follow the steps below to run the UASWindows10 virtual machine on UAS-Host2:
   a. If necessary, start another instance of VMware Workstation Player and then start you UAS-Host2 virtual machine.
   b. Simulate a problem by powering down your UAS-Host1 virtual machine.
   c. If necessary, open a browser tab for your UAS-Host2 and then login using your root username and password.
   d. Follow the procedure in step 4 to add your Windows 10 VM to UAS-Host2's Virtual Machine page. You now have the Windows 10 virtual machine available to UAS-Host2. In the next step you will demonstrate the ability to run the Windows 10 VM using UAS-Host2.
7. Follow the procedure in step 5 to test your Windows 10 VM running on UAS-Host2.
8. Assume that Universal AeroSpace has repaired and upgraded their UAS-Host1 system. Follow the steps below to move the Windows 10 system back to UAS-Host1.
   a. Start another instance of VMware Workstation Player and then start your UAS-Host1 system.
   b. After the host starts, open a browser tab, start the VMware Host Client and login to UAS-Host1.
   c. Click on Virtual Machines in the Navigator pane.
   d. Follow the procedure in step 5 to test your Windows 10 VM back on UAS-Host1. Notice how the Windows 10 VM can be run on either host.
9. Power down your virtual machine and close your Web browser.

You can now power off all your virtual machines.

In the later chapter 8 activities you will install vCenter and then use it to create a cluster of Hosts to implement more advanced features of vSphere such as load balancing and virtual machine migration.