

# Lab 7 – Working with Disks

This lab is to be completed on Server1

Approximate completion time: 80 minutes

Upon completion of this lab you will be able to:

- Manage your hard disks using the Disk Management tool
- Manage your hard disks using DISKPART
- Mount a volume in an NTFS folder

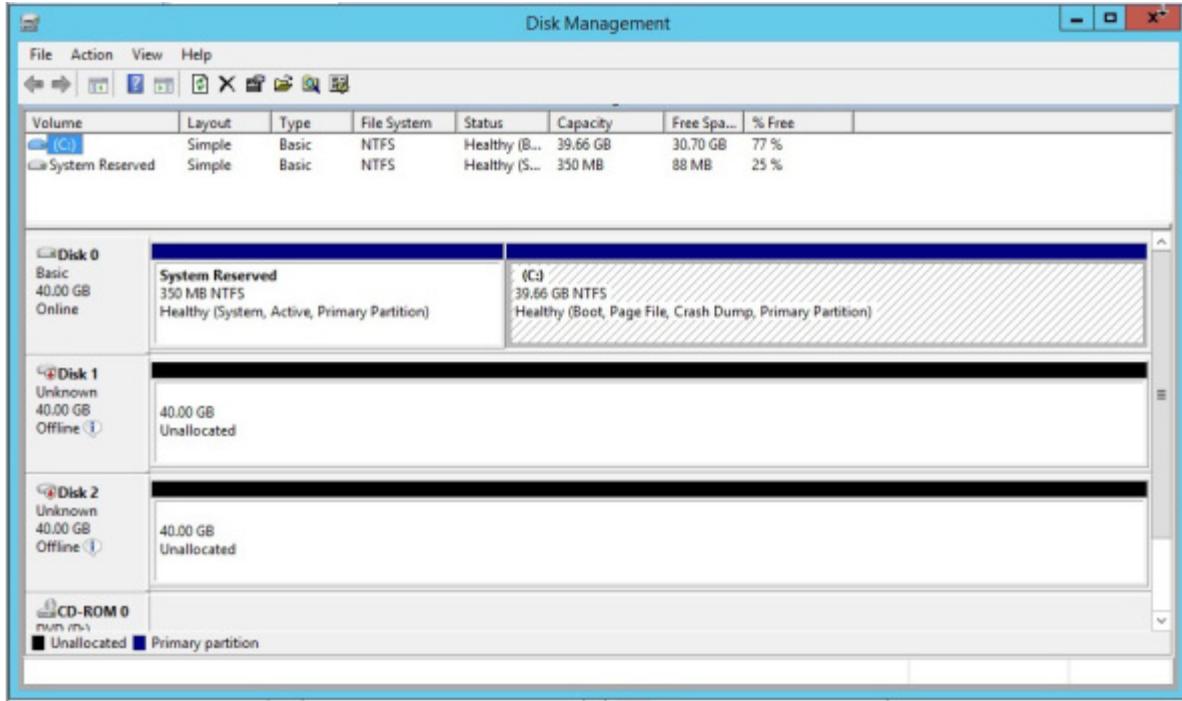
## 1.0 Adding a second HDD to Server1

Since the current virtual hard drive you are using with Server1 is relatively small you are now going to add a second virtual hard drive to use to create new partitions on.

1. Open Server1 in VMWare Workstation Pro. DO NOT power it on.
2. Right click **Server1** in the left sidebar and choose **Settings**.
3. Click ‘Add’ at the bottom of the window.
4. You will be adding a new virtual hard disk, so select **Hard Disk** and make sure the settings are as follows
  - type SCSI
  - size 40GB
  - store the virtual disk as a single file
  - leave default settings for everything else and click Next until you see the screen to change the filename
  - change the filename to ‘Server1-Disk2.vmdk’
6. Click ‘Finish’.
7. Add a second virtual hard disk with the same parameters as disk 2 but the name of it should be ‘Server1-Disk3.vmdk’
8. Click OK to save and close the settings window and power on your VM.

## 2.0 Initializing new virtual hard disk

1. Power ON Server 1 and login. Open up the Disk Management tool by right clicking the start button (bottom left hand corner) and selecting Disk Management.
2. You should now see the two new virtual hard disk you just added to Server1 as seen below



3. This new hard drive is offline and not initialized.
4. Right click where it says disk 1 and click 'Online'. Right click where it says disk 1 again and now choose initialize. Keep 'MBR' selected and click 'OK'.
5. Do the same thing for disk 2 but select 'GPT' when initializing the disk.

### 3.0 Creating partitions on a basic MBR disk

1. Open the disk management console (see step 1 in 2.0)
2. Right click the unallocated space on disk 1 and select 'New Simple Volume'. This will launch the New Simple Volume Wizard. Click Next on the initial screen to proceed to the Specify Volume Size screen.
3. Enter the size of the volume to be created. Use 40000 MB (~40GB), and click Next. By default, the wizard will allocate the next available drive letter to the new volume, but this can be changed. Choose drive X: and click Next.
4. On the Format Partition screen list below the available file systems from the dropdown box:
5. Cancel the creation of the partition.
6. Create a New Simple Volume with a size of 2000 MB (~2GB). Choose drive X: from the drive letter and click Next. On the Format Partition screen:
  - a. List the available file systems:

- b. Why are the choices different this time?
7. Continue with the creation of the Simple Volume using the following settings: File System: FAT32 Allocation unit size: Default Volume Label: BASIC1 Put a checkmark in the Perform a quick format, checkbox. Click Next.
8. On the summary screen, assuming the settings are satisfactory, click on Finish to begin the formatting process. The wizard will close and the disk in the graphical display will show the new volume as a primary volume and show the progress of the formatting process. Once the process is completed the disk will be ready to use.
9. Verify that the partition you created is a Primary Partition.
- a. How do you know it is or is not a Primary Partition?
10. Using the information in the Disk Management tool and the diskpart tool, record the disk number and partition number below. The disk number will be Disk 1, and for the partition number, count 1, 2, 3 etc. from the left hand side of the disk, to the BASIC1 partition. Disk number: Partition number:
11. Record the amount of unallocated disk space available on disk 1, in GB: Convert the GB to MB (x1024) and enter the value here:
12. Close the Disk Management tool.
- ## 4.0 Extending, Shrinking and Converting a Partition
- ### 4.1 Extending a Partition with Diskpart.exe
1. Open an Administrative Command Prompt window. Type *diskpart* and press Enter. A DISKPART> prompt appears.
  2. Type *select disk x*, where x is the number of your disk as recorded above in #10. Press Enter. The program responds, indicating that disk x is now selected.
  3. Type *list partition* and press Enter. A list of the partitions on your disk appears.
  4. Type *select partition x*, where x is the number of the BASIC1 partition, and press Enter. The program responds, saying that partition x is now the selected partition.
  5. Type *extend size=xxxx* where xxxx is approximately HALF the amount of unallocated disk space in MB as recorded in #11 above. Press Enter. (Note: if the unallocated space is 38GB, extend the partition by 19000 MB. Do not use decimal places in this number.)
    - a. Why does the command not execute properly (error message)?
  6. Type *exit* and press Enter. The DISKPART program terminates, returning you to the standard command prompt.

## 4.2 Converting a Partition from FAT32 to NTFS

1. At the command prompt (NOT in DISKPART), type `convert x: /fs:ntfs /v /x` and press Enter. The system prompts you for the volume label of the X: drive. Type *BASIC1* and press Enter. The system should successfully complete the conversion of the volume from FAT32 to NTFS.

2. Use the instructions from [section 4.1](#) to extend your partition, then continue to the next step.

3. After you have successfully extended your partition, exit the DISKPART program and close the command prompt.

4. Open the Disk Management tool and see your new extended partition.

## 4.3 Shrinking a Partition

1. In the Disk Management tool, right click the *BASIC1* volume you created, and from the context menu, select Shrink Volume. The Shrink X: dialog box appears.

2. In the **Enter the amount of space to shrink in MB:** field, enter *10000*. Your new volume size will be displayed in the Total size after shrink in MB: field. Click Shrink.

\*\*If you had files on this drive, you would only be able to shrink the volume by the amount of UNUSED space that was available.

3. View your new smaller volume in the Disk Management tool.

\*\*Remember on a Basic MBR disk, you can have up to 4 Primary Partitions or 3 Primary + 1 Extended Partition divided into Logical Drives.

## 5.0 Creating Extended Partitions and Logical Drives and Primary Partitions.

### 5.1 Creating an Extended Partition and Logical Drives

The Disk Management tool is a very easy tool to use to manage your hard disks, and it has protections built into it so that no disk space is wasted.

1. In the Disk Management tool, right-click the Unallocated Space and create two new partitions with the following specs:

Name (Volume Label): PART2

Size: 5000MB

Drive Letter: Y:

File System: NTFS

Quick Format

Name (Volume Label): PART3

Size: 5000MB

Drive Letter: Z:

File System: NTFS

Quick Format

2. Create a fourth partition with the following specs:

Name (Volume Label): PART4

Size: Use all remaining space on the drive

Drive Letter: M:

File System: NTFS

Quick Format

a. What do you notice about this partition?

3. In the new EXTENDED partition, you will see that a Logical Drive has already been created.

a. Delete the logical drive

b. Right-click the free space and create a logical drive with half of the space,

c. Create another logical drive with the remaining half of the space, but do not format this last partition using the Disk Management tool.

d. What label does the unformatted drive have, instead of stating the file system?

4. Exit the Disk Management tool.

## 5.2 Formatting a Partition with Diskpart.exe

1. Open an Administrative Command Prompt and start the diskpart program. Select your disk and list the partitions on your disk. You should see Primary, Extended and Logical types.

a. Record the output of your list partition command here:

2. Type *select partition x*, where x is the number of the unformatted logical partition, and press enter to select the unformatted logical drive from section 5.1.

3. Type *format fs=ntfs label="My Volume" quick* and press Enter. Diskpart should give you a success message once the volume has been formatted.

## 5.3 Deleting and Creating Partitions with Diskpart.exe

You may have noticed above, that you were not able to create a 4th Primary partition using the Disk Management tool. You can create as many Primary partitions as you want with DISKPART, however, you must remember that Windows Server may not be able to use see all of them. The protections that exist in the Disk Management tool, do not exist in DISKPART, so you do have to know what you are doing when using it.

1. If you are not still in DISKPART from the previous exercise, open a Command Prompt and open DISKPART.

2. Select your disk.

3. List your partitions.
  4. Select the last logical drive in the list. (select partition x).
  5. Use the following command to delete the partition: *delete partition*.
  6. Use the same commands to delete the other logical drive and the extended partition.
  7. Use the following command to create a primary partition:  
*create partition primary size=5000*
  8. Format the partition as NTFS and give it a volume label of PRIMARY4, use the command from 5.2
  9. Exit DISKPART and the Command Prompt and open the Disk Management tool.
  10. Verify that you can see your new Primary partition. You should still have unallocated space on your disk. Right-click on the unallocated space and try to create a new partition.

**\*\*Notice the warning message. DO NOT CONTINUE. If you do, you will turn your disk into a Dynamic disk and you cannot convert it back without deleting everything you have done.**
  11. Extend the last primary partition to include all of the unallocated space on your hard disk.
- ## 6.0 Mounting a Volume
- Notice that there is no more unallocated space for us to extend any of our drives. What if we wanted to make our drive X: bigger? We can mount a volume to a folder on our drive X:.
1. Open Computer to see all of your drives. Right-click on drive X: and then select Properties.
    - a. How much space is available on drive X: ? Record it here:
    - b. Close the Properties of drive X:
  2. Open the Explorer and create a folder on the root of drive X: called VIDEO.
  3. In the Disk Management Tool, right-click the last Primary partition on your disk, and select Change Drive Letter and Paths. Remove the drive letter assignment. You should see the drive letter disappear in the Disk Management tool. If it does not disappear, hit F5 on the keyboard to refresh the view.
  4. Right-click the drive again, and select **Change Drive Letter and Paths**. Click the Add button then select **Mount in the following empty NTFS folder:** Browse to X:\VIDEO and click OK and OK again.
  5. Open Computer and Right-click drive X: and select Properties. Unfortunately the operating system does not report that there is additional space available (it used to), but there is.

6. Open the VIDEO folder and note that it behaves just like a regular folder. A user would never know they are using space on another partition, or potentially another hard disk.

## 7.0 Creating A LOT of primary partitions on a GPT disk

Remembering from above, disk 2 is using the GPT partition style rather than MBR which disk 1 is using. GPT disks allow for 128 primary partitions on Windows Server 2012.

1. Open up an Administrative Command Prompt.

2. Run the following commands

- diskpart
- list disk
- select disk 2
- list partition

3. You should notice there is one partition already created. This is a reserved partition that GPT uses to store system information.

4. Create as many primary partitions as you can using the command create partition primary size=5000

5. Run the above command as many times as you can until you get the error telling you there is no usable free space.

6. Type list partition

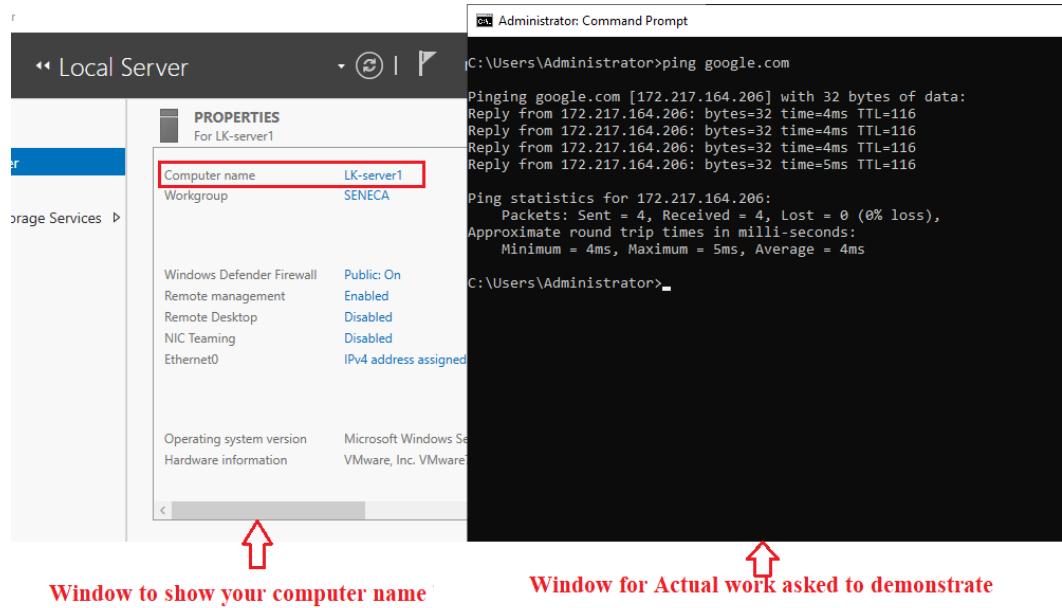
- How many partitions did you create?

7. Open up Disk Management just to see the partitions you created. Note that they are all primary partitions, not extended, and you did not have to convert your disk to a dynamic disk.

In order for this lab to be considered complete, you must do the following

- Take a screenshot of the Disk Management tool displaying the partitions that were created on your virtual hard disks. Save the file as Partition.jpg
- Take a screenshot that show the X:\VIDEO folder. Save the file as XFolder.jpg

Whenever you take a screenshot of your actual work that you are asked to demonstrate, please make sure you take a screenshot of your computer name along with the actual work together (side by side). For reference, please see the screenshot below:



Upload Partition.jpg and XFolder.jpg to the Lab 5 submission link in Blackboard