

Command References

Here's what you need:

- A Windows Server or Professional Client with the Hyper-V role (server) or Windows Feature (workstation) installed
- 8GB of RAM available for the virtual machine (it can be done with as little as 1GB but small amounts of memory allocated to the virtual machine will respond more slowly)
- Windows Server 2016 DVD or *.iso file – evaluation copies of Server 2016 may be available for download from Microsoft's website
- 100GB available HDD
- Processor that supports virtualization preferred, should be enabled in BIOS

Steps:

Create a New Virtual Server

Install Windows Server 2016 Standard Edition

Create and Mount Virtual Hard Drives

Configure New Drives in Windows Server 2016

Let's Get Started

Create a New Virtual Server

Start by opening the Hyper-V Manager. Before creating a new virtual machine, look in the top, center pane to see if any other virtual machines are currently running. If so, make sure you will have enough available memory for this new virtual machine.

Under the **Action** menu, select **New > Virtual Machine...** to start the New Virtual Machine Wizard. Name your new virtual machine **Server 2016 Drive Configuration Lab** and click **Next >**.

Choose to create a **Generation 1** virtual machine, especially if you are uncertain about your processor's compatibility with virtualization support, and click **Next >** to continue.

Next you will specify the amount of memory that will be available to the virtual machine. If you have 8GB available, enter **8192** in the box. You can enter more or less based on available resources and the virtual

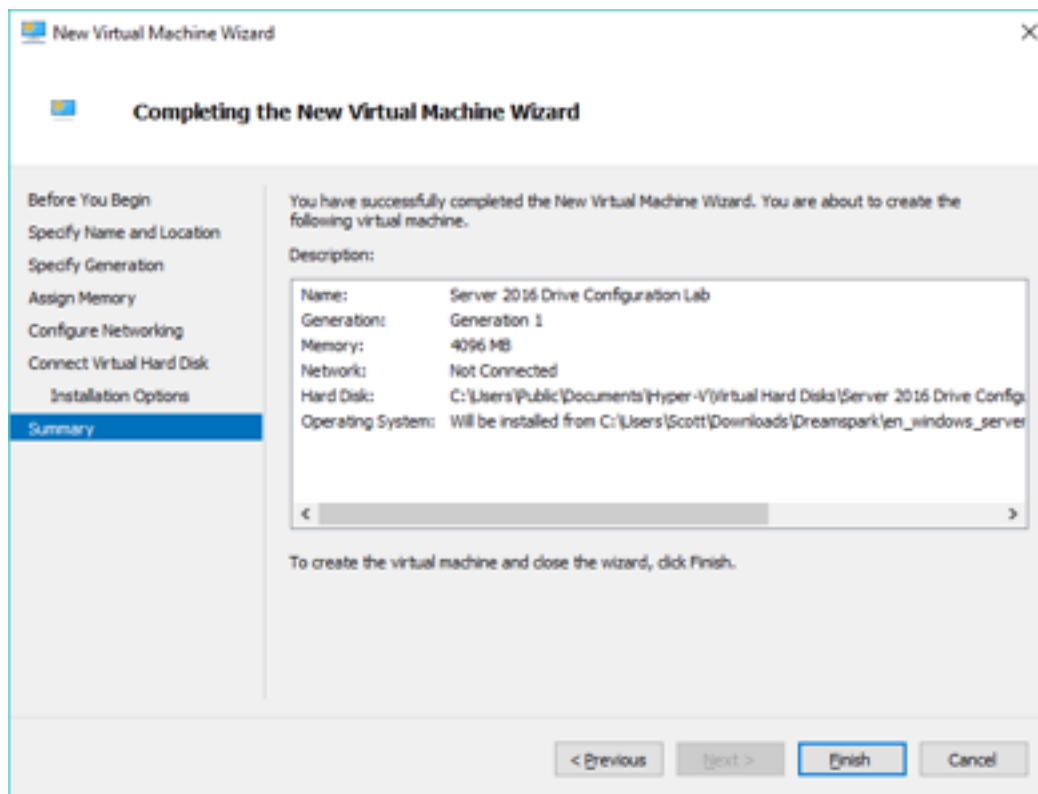
server's performance will be effected accordingly. Checking the box for **Dynamic Memory** is a good way to not block out the entire specified amount of RAM when the virtual machine isn't using it.

It is not necessary to connect to the internet for this lab. Leave the network connection on **Not Connected** and click **Next >**.

On the **Connect Virtual Hard Disk** screen you will want to **Create a virtual hard disk**. The defaults for the name and location should be fine. Change the **Size** to **100** and click **Next >**

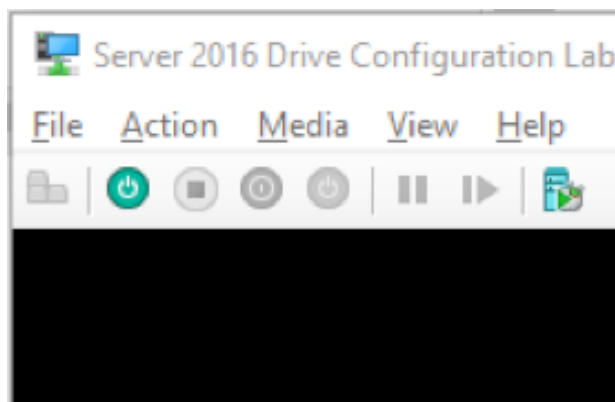
Here you will specify that you want to install from the Server 2016. Select the second option: **Install an operating system from a bootable CD/DVD-ROM**, then select your DVD drive if installing from physical media or select **Image file (.iso)** is installing from a downloaded image. Browse to the Server 2016 image before clicking **Next >**.

When your summary page looks something like this you can click the Finish button.



Select your new virtual machine from the top, center pane of Hyper-V Manager and open your new virtual machine by selecting the **Action** menu and clicking **Connect...**

Install Windows Server 2016 Standard Edition



If you were able to complete all of the steps in the previous section, your virtual machine should be created with the installation DVD already mounted and the boot order set. Power on your virtual server by clicking the blue-green power button on the toolbar at the top of the virtual machine.

The new virtual machine may have a screen that is larger than the visible area, so scroll the virtual machine to be able to see the installation prompts.

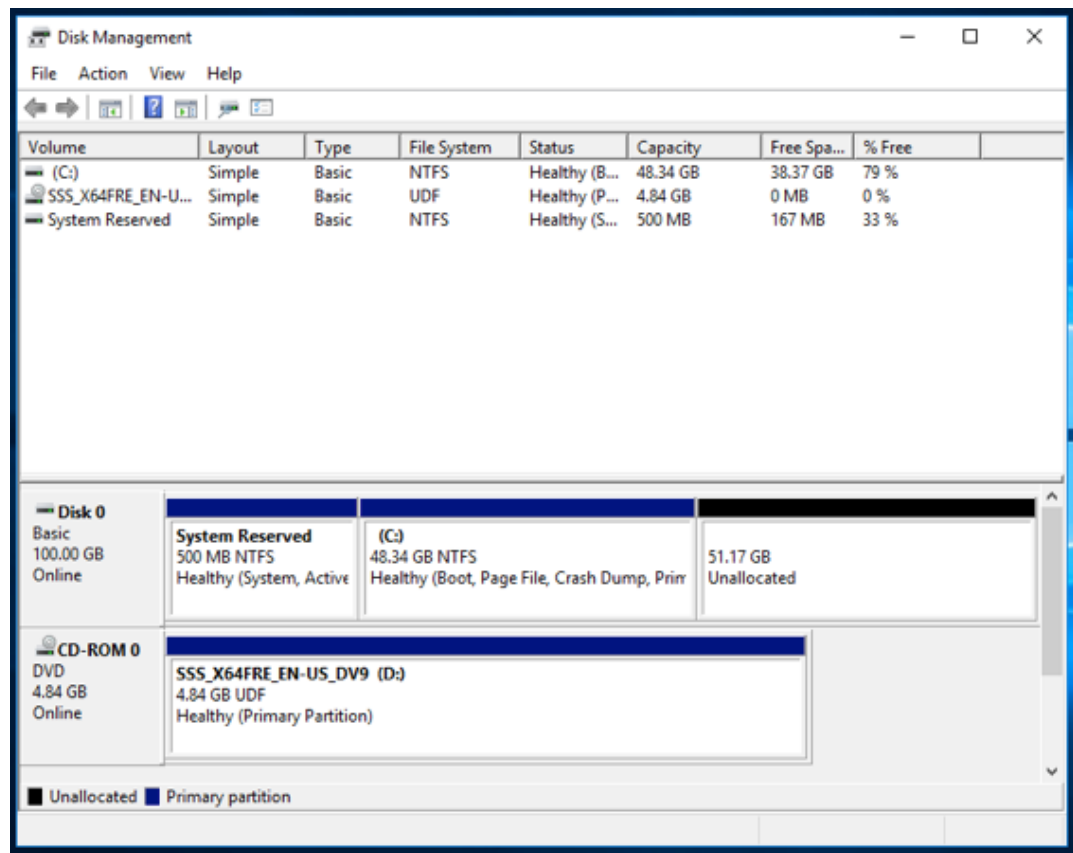
Set your language and region and begin the installation. If you downloaded an evaluation, or if you plan to delete this virtual machine upon completion of this exercise, you may continue without entering a product key using the link at the bottom of the install screen.

When prompted to select an operating system to install, select **Windows Server 2016 Standard (Desktop Experience)**. Accept the license agreement and continue to the screen where you can select upgrade or custom. Choose **Custom: Install Windows only (advanced)**.

On the next screen you get to make some decisions about how the first hard drive is configured. It is currently unallocated, meaning no partitions or volumes have been defined. Click on the **New** link to create your Windows partition. Server 2016 needs a minimum system partition of 32GB. This lab will not require us to install roles, features, and apps that take a lot of space, but minimums are never good, so enter **50000** in the size box and click the **Apply** button. A dialog will appear to let you know that Windows might create an additional recovery partition. This is for information only and does not give you anything to select, so click the **OK** button to clear the dialog. Make sure your new partition, 48.3GB in size, is selected and click the **Next** button to continue.

You now have between 10 minutes and an hour to wait, depending on the amount of RAM and other resources available to the virtual machine. When it is complete it will reboot the virtual machine. When the installation is almost complete you will be prompted to enter a password for the administrator account. It should have uppercase and lowercase letters as well as a number and symbol, so use **Action1!** for the password. Type it twice and continue so Windows can complete the installation.

Before continuing to the next session, take a moment to see how your hard drive is configured now. Log in to your newly installed server. Once you are at a desktop, right-click on the Start menu and select **Disk Management** from the menu that appears. Your screen should look a bit like this one



Notice in the diagram below that you have one physical disk, labeled **Disk 0** and that it is a basic disk. You also have a CD/DVD drive assigned the letter D:. In **Disk 0** you can see the recovery partition that Windows created, labeled System Reserved, and the 48.34GB partition (C:) that you created during installation. You also have just over 50GB not assigned to a partition. If your disk manager looks like this, you are ready to continue.

Create and Mount Virtual Hard Drives

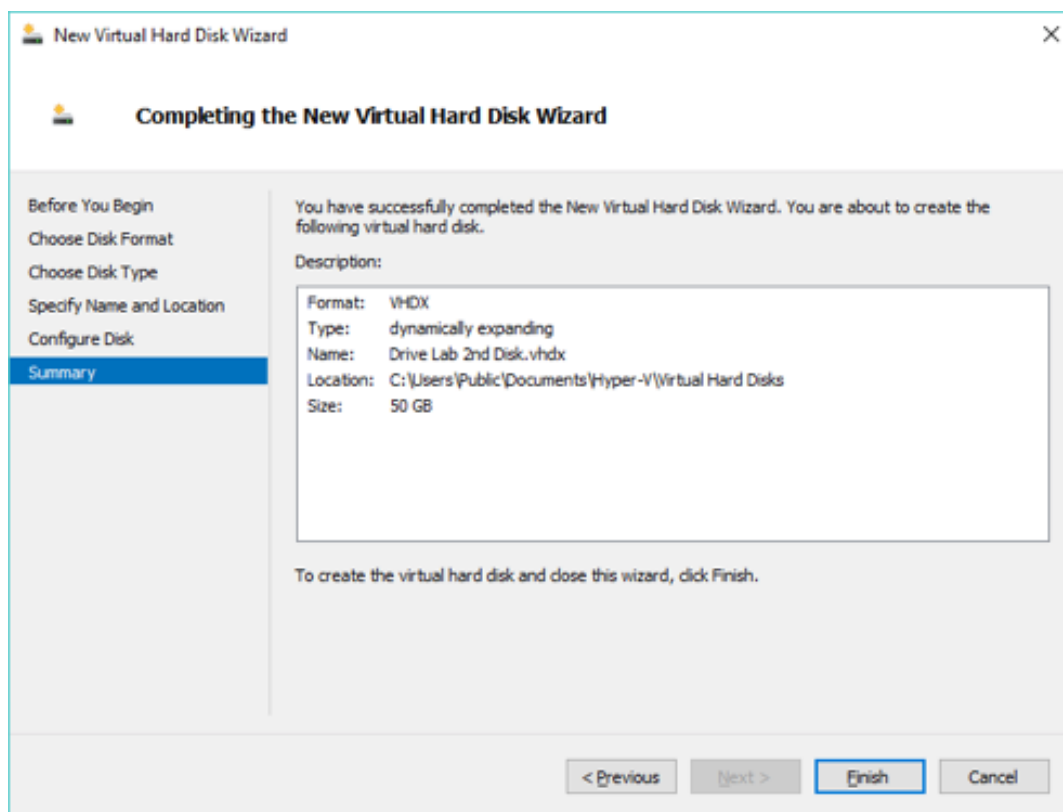
Adding a hard drive to a server is most easily done when the server is powered down, so shut down your virtual server and return to the Hyper-V Manager. Watch the top, center pane of Hyper-V Manager to confirm that your lab server is in the **Off** state. Then you can single-click the lab machine and under the **Action** menu select **Settings...**

On the left you will see a hardware list for your server. Click on **IDE Controller 0** and notice the option to

the right. Select **Hard Drive** and click the **Add** button to launch the wizard. The controller and disk location should automatically be set. We have not yet created a second virtual drive so select the **New** button to continue. The settings you will enter in the New Virtual Disk Wizard are:

- VHDX
- Dynamically Expanding
- Drive Lab 2nd Disk
- <<default path>>
- Create: 50GB

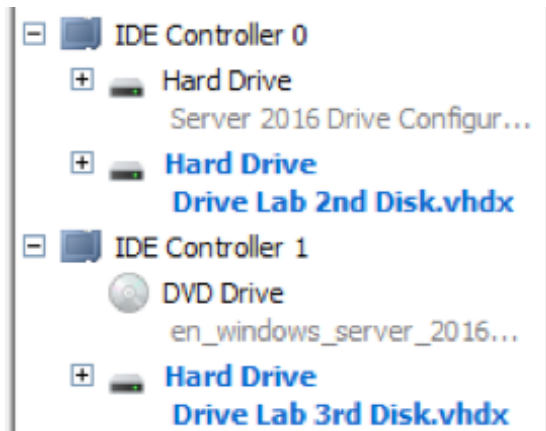
If your summary screen looks like this, click the **Finish** button to return to the settings for your virtual server.



Go through these steps again with the following changes:

- Before you click the **New** button, select Controller IDE Controller 1 and Location 1.
- Name this drive Drive Lab 3rd Disk.

Once you finish creating the 2nd disk, the hard drive section of the virtual machine settings page should look like this. When it does, click the **OK** button to finish, then return to your virtual machine and power it back on. Keep in mind that if you closed the window to the virtual server, you will need to both power on and connect to the server to continue. Log in to the server as administrator with the password, **Action1!** and close **Server Manager**.



Configure New Drives in Windows Server 2016

You now have a server with three hard drives installed. The first time you launch the disk manager you will be prompted to initialize the disks so they can be part of the managed resources. Go ahead and do this, selecting **MBR** as the partition type.

You are prepared to experiment with different types of volumes to see their setup processes and their limitations. Feel free to explore these features on your own. I have provided a few exercises below that, if you choose to follow them, must be done in order. As always, I encourage you to become familiar with these configurations through experience in a safe lab environment before configuring production servers. This lab environment is a great way to learn.

Shrink the C Drive:

- In the graphic view of Disk Management, right click on the C: partition and select Shrink Volume
- Enter the amount of shrink (the amount to cut out) at 24499 and click the Shrink button

Convert to Dynamic Disk

- Right click on one of the physical disks (Disk 0, Disk 1, or Disk 2)
- Select Convert to Dynamic Disk

- Check the boxes for all drives and click the OK button
- Confirm that all three disks will be converted and click the Convert button
- Read the warning and click the Yes button

Mirror the Windows System Volume

- Right-click on the C: drive and select Add Mirror...
- Select Disk 2 as the location of the mirror and click the Add Mirror Button
- The server will copy everything from the C drive to the allocated space on the 3rd disk (will take several minutes)

Create a RAID 5 (striping with parity) Volume

- Right-click on any unallocated space and select RAID-5 Volume
- Proceed through the wizard and select the remaining two drives by double-clicking them one at a time until all three appear in the Selected box and none are in the Available box
- The amount of space per drive is already set to the maximum space on the smallest drive; change the number to 25000 and click next
- Assign this drive letter R and click next
- Change the file system to ReFS, change the volume label to RAID5, and check the box for quick format.

Create an Extended Volume

- Right-click on the remaining space at the end of Disk 2 and select Create Simple Volume
- Accept the suggested size for the volume
- Assign the letter E
- Format NTFS and set the volume label to Extended
- Check the box for a quick format and finish the wizard
- Right click on the volume labeled Extended and select Extend Volume
- Add Disk 0 by double-clicking it in the Available box
- Leave the amount of space as suggested
- Finish the wizard

Questions:

What color header is on a volume with no protection if one drive fails?

Red / Blue / Purple

What color header is on a volume that could continue with one drive failing and no downtime?

Red / Blue / Purple

Would you have been able to create the mirrored set if the physical disks were left as Basic Disk?