Creating a new virtual disk You can create a VHD file at any time without adding it to a VM by using the New Virtual Hard Disk Wizard in Hyper-V Manager. To create a new virtual disk, use the following procedure.

1. In Server Manager, on the Tools menu, select Hyper-V Manager. The Hyper-V Manager console opens.

2. In the left pane, select a Hyper-V server.

3. From the Action menu, select New, Hard Disk to start the New Virtual Hard Disk Wizard, displaying the Before You Begin page.

4. Click Next to open the Choose Disk Format page.

5. Select one of the following disk format options:

■■ VHD Creates an image no larger than 2 TB, using the highly compatible VHD format

■■ VHDX Creates an image up to 64 TB, using the new VHDX format

6. Click Next to open the Choose Disk Type page.

7. Select one of the following disk type options:

■■ Fixed Size Creates a disk of a specific size, allocating all of the space at once

■■ Dynamically Expanding Creates a disk that can grow to the maximum size you specify as you add data

■■ Differencing Creates a child drive that will contain changes made to a specified parent drive

8. Click Next. The Specify Name And Location page opens.

9. Specify a file name for the disk image in the Name text box and, if desired, specify a location for the file other than the server default. Click Next to open the Configure Disk page.

10. For fixed and dynamically expanding disks, select and configure one of the following options:

■■ Create A New Blank Virtual Hard Disk Specifies the size (or the maximum size) of the disk image file to create

■■ Copy The Contents Of The Specified Physical Disk Enables you to select one of the physical hard disks in the computer and copy its contents to the new disk image

■■ Copy The Contents Of The Specified Virtual Hard Disk Enables you to select an existing virtual disk file and copy its contents to the new disk image

11. Click Next. The Completing The New Virtual Hard Disk Wizard page opens.

12. Click Finish. The wizard creates the new image disk and saves it to the specified location.

You can create new VHD files by using Windows PowerShell, which gives you more control than is available through the graphical interface. To create a new disk image, use the New-VHD cmdlet with the following basic syntax:

```
New-VHD –Path c:\filename.vhd|c:\filename.vhdx
–Fixed|-Dynamic|-Differencing –SizeBytes <size>
[-BlockSizeBytes <block size>]
[-LogicalSectorSizeBytes 512|4096] [-ParentPath <pathname>]
```

When using the cmdlet to create a disk image, the extension you specify for the filename determines the format (VHD or VHDX); also, you can specify the block size and the logical sector size for the image, two things you cannot do in the GUI. For example, the following command creates a 400-GB fixed VHDX image file with a logical sector size of 4 KB:

```
New-VHD –Path c:\diskfile.vhdx –Fixed
–SizeBytes 400GB -LogicalSectorSizeBytes 4096
```

What are Hyper-V Differencing Disks?

A *differencing disk* contains block data that represents changes to a parent virtual hard disk. The salient properties of differencing disks are:

- A differencing disk must have exactly one parent. No more, no less.
- The parent of a differencing disk must be another virtual hard disk. You cannot attach them to pass-through disks, a file system, a LUN, a remote share, or anything else.
- The parent of a differencing disk can be any of the three types (fixed, dynamically expanding, or differencing)
- Any modification to the data of the parent of a differencing disk effectively orphans the differencing disk, rendering it useless
- Hyper-V can merge the change data back into the parent, destroying the differencing disk in the process. For Hyper-V versions past 2008 R2, this operation can take place while the disk is in use

Typically, differencing disks are small. They can grow, however. They can grow to be quite large. The maximum size of a differencing disk is equal to the maximum size of the root parent. I say “root” because, even though a differencing disk can be the parent of another differencing disk, there must be a non-differencing disk at the very top for any of them to be useful. Be aware that a differencing disk attached to a dynamically expanding disk does have the potential to outgrow its parent, if that disk isn’t fully expanded.

How Do Differencing Disks Work?

The concept behind the functioning of a differencing disk is very simple. When Hyper-V needs to write to a virtual disk that has a differencing child, the virtual disk driver redirects the write into a differencing disk. It tracks which block(s) in the original file were targeted and what their new contents would have been. ***The most important thing to understand is that the virtual disk driver makes a choice to write to the differencing disk***.