

# Dynamic Disks

Suppose you've run out of space on the hard drive you use to store movies and music, and you've installed another one to collect the overflow. Thanks to a Windows feature called *dynamic disks*, you don't have to move files to the new drive or reorganize your folder scheme. Instead, you can make the new drive fold its space seamlessly with the first drive's, so you suddenly have more disk space on your "one" combo drive.

If you're working with very large files (like those home movies you spend all your free time editing), you can do something similar; instead of folding one drive into another, you can tell Windows to treat a pair of disks as a single disk.

Windows can then save data onto them in an alternating pattern. This makes everything a lot faster, because Windows doesn't have to wait until the first disk finishes saving a chunk of a file to start saving the next chunk. Instead, it can save (or open) files two chunks at a time, on two disks simultaneously.

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**Note:** Unfortunately, you can't extend your startup drive (the C: drive that contains your Windows 10 installation). If you're running out of disk space on your C: drive, you can move your large documents and media files onto another drive you've installed. You can also save a lot of space by uninstalling large programs from the C: drive, and then reinstalling them on the other drive. (If you do this with a game, though, be sure to back up your saved games when you uninstall, and restore them when you reinstall; see the support forums or FAQ for the game before you proceed).

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## How Dynamic Disks Work

If this setup intrigues you, a bit more technical explanation is required.

When you (or your PC maker) first installed Windows, it configured each drive as a *basic disk*—a disk with its own drive letter. But before you can combine two actual drives into one volume, you must first convert them into a more flexible format that Microsoft calls a *dynamic disk*.

The good news is that you can convert a basic disk into a dynamic disk without losing any data on the drive. The bad news is that you can't change a dynamic disk *back* to a basic disk unless you erase all the data stored there.

And why would you want to change it back? Because dynamic disks, for all their flexibility, also have some limitations. Before you proceed with converting basic disks to dynamic disks, assume a reclining position and read the following fine print:

- Once you've combined two physical disks into an über-disk (technically called a *spanned volume*), a fatal problem on *one* of the two hard drives will make you lose all the data on *both* drives—an event that can ruin your whole morning. Keeping regular backups of your spanned volume is critically important.
- Dynamic disks are a specialty of Windows 8 (Professional, Enterprise, and Ultimate) and later. No other version of Windows can read them.
- A dynamic disk can contain only one operating system. You can't *dual boot from another partition on a dynamic disk*, as you can with basic disks. (Dual booting means choosing which of two operating systems to use each time you turn on the PC.) Since you can't extend your boot drive, it's unlikely that you'd want to turn it into a dynamic disk, but you should keep this limitation in mind if you decide

### GEM IN THE ROUGH

## What About Extending Basic Disks?

Windows 8 allows you to extend (and shrink) basic disks as well as dynamic disks. Previously, you'd have to buy a program like Paragon Partition Manager to perform this kind of operation.

But why would you want to resize your basic disk? In most cases, your basic disk already takes up the entire physical disk drive. However, many computer manufacturers devote several gigabytes of precious disk space to storing *restore images* so you can quickly and easily restore your computer to its factory-fresh state (minus the new-computer smell).

You may not need these restore images. Maybe your PC manufacturer provided a utility program that can generate a set of installation discs, or will sell you a set for a small

fee, or maybe you bought a full retail copy of Windows 8 (not an upgrade version). The point is, though, that if you're sure you'll never need the volume that contains your restore images, you may be able to delete it and extend your C: drive into the space you freed up.

To delete a partition, right-click it in the Disk Management window; from the shortcut menu, choose Delete Volume (this is a good time to pause and think about how fresh your backups are). Once you've done that, you can right-click your C: drive and select Extend Volume.

You can just as easily *shrink* your C: drive, perhaps to make room for dual-booting another operating system like Linux.

to install another operating system, such as Linux, onto the disks you want to convert to dynamic disks.

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**Note:** You might have a dual-boot system and not even know it. Many manufacturers hide a bootable operating system on the hard drive whose sole purpose is to restore your computer to its original configuration when things go wrong.

For example, some manufacturers put a copy of DOS on a small partition. If you hold down F11 as the computer is starting up, it launches into DOS, loads disk-imaging software, and uses it to restore your hard drive using files from yet another partition—this time, a hidden 3.5 GB partition.

If you convert your drive to a dynamic disk, you will lose the ability to invoke this rescue mode.

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- To convert a hard drive to a dynamic disk, it must set aside an invisible storage area to hold a *dynamic disk database*. If you partitioned the drive using Windows, then it already reserved enough space for this purpose. But if the drive was partitioned with another operating system, you may have to erase it before converting it to a dynamic disk.
- Dynamic disks generally don't work on laptops, removable disks, disks connected by USB cables or IEEE 1394 (FireWire) cables, or disks connected to shared SCSI or Fibre Channel buses. If your disks fall into any of these categories, Windows won't let you convert them to dynamic disks.

## Extending onto Another Disk

If you've installed a new hard drive, Windows treats it as *unallocated space*—disk space that doesn't belong to any volume yet. It's just sitting there, unaccounted for, unusable, waiting for you to make it part of one volume or another. And whenever you find yourself with unallocated space, you can savor the flexibility of dynamic disks.

If you haven't yet been scared off by the cautions in the previous section and are ready to extend one of your existing disks onto another, the procedure is simple. First, back up your computer. Tragedy isn't likely to befall you, but it's a good idea to back up before performing any kind of traumatic surgery to the disks in your computer.

### POWER USERS' CLINIC

#### Extending a Volume

One big advantage of dynamic disks is that you can extend an existing volume whenever you feel like it, just by allocating additional disk space to it. If, for example, you run out of space on a volume you've named Data, and you still have some unallocated space on some other disk, you can simply add it to the Data volume to make it bigger. The unallocated space you specify becomes a permanent part of the Data volume. (Note that this is a one-way trip. Once

you've added free space to a dynamic volume, it becomes part of that volume permanently, or at least until you delete the volume—and its data—and recreate it.)

The disk space you use to extend the volume can come from either the same disk or another dynamic disk (in which case you create a *spanned* volume). Note, though, that you can't extend the *system* volume, nor any volume that was originally a partition created by another operating system.

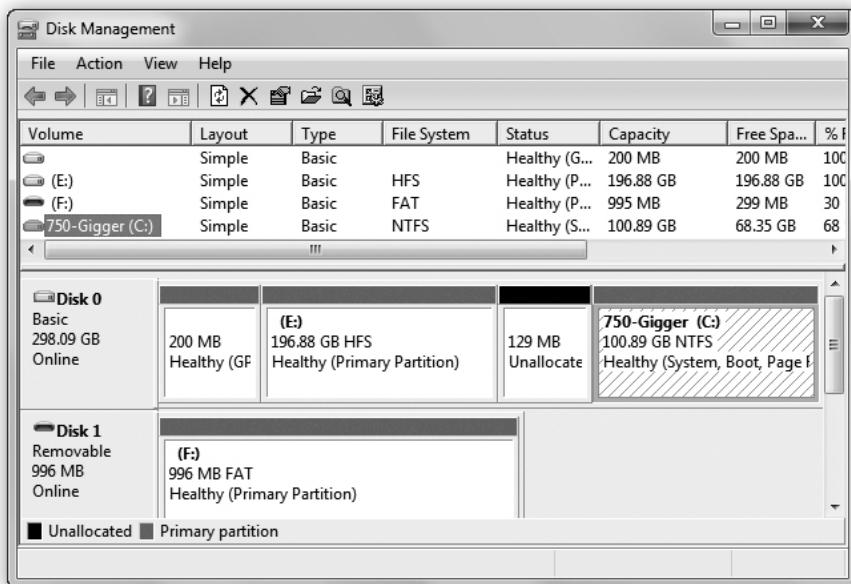
Next, log onto the computer as a user with administrative privileges, and exit any programs that might be running on the disk you plan to convert.

You convert disks and manage the dynamic volumes on them using a special window called the Disk Management console. To open it, type `diskmgmt` into the Search box, and then choose Disk Management in the results.

Once this window is before you, you see a display of your drives and the partitions on them, as shown in Figure 1.

**Note:** If you've just installed an additional hard drive, Disk Management notices the next time you start it up. It prompts you to initialize the new disks; select the partition style you want to use. In most cases, you should choose the proposed format, MBR (Master Boot Record, which has been used by Windows and MS-DOS for years). The dialog box will tell you when the other choice, GPT (the newfangled GUID Partition Table, used by PCs that are designed around a replacement for the venerable PC BIOS called EFI), is appropriate. Click OK.

**Figure 1:**  
*The Disk Management console is the central toolbox for all your disk-related tasks. This is where you create the dynamic volumes on your disks. Notice that drive E: is in trouble—it has no remaining free space. Read on for the solution.*



The top part of the window lists the partitions on your computer. The bottom part contains a horizontal box representing each drive on your computer, with smaller boxes inside indicating the partitions on each drive. Notice that the header box for each drive indicates the number of the drive in your system, its capacity, whether or not it's online, and the word "Basic" (indicating that it's currently a basic disk).

Next, you need to decide how you want to expand the disk. You have a choice between *spanning* and *striping*. You can also choose to create a simple dynamic disk, but that won't let you combine two disks into one.

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**Tip:** You can delete a dynamic volume as easily as you created it. Just right-click it in the Disk Management window and select Delete Volume from the shortcut menu. Doing so deletes the entire volume, erasing all the data on it and removing its space from any spanned or striped space on other disks.

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Here's a rundown of each:

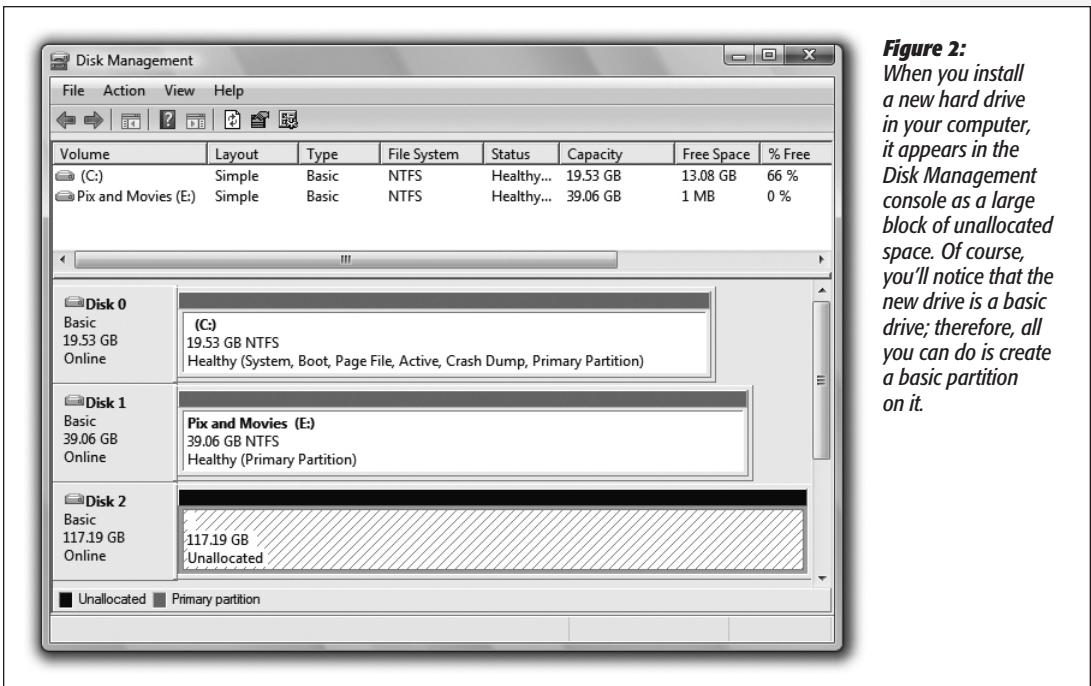
### **Extending into a spanned volume**

Suppose you've managed to shoehorn every byte of data you possibly can onto the hard drive you use for holding video files. You decide to install a second hard drive, to give you more space.

But then what? You don't want to spoil the carefully organized folder structure on your old hard drive by moving parts of it to the new drive; you just want to continue to build on your folders as they are.

The solution, as you know if you've read the beginning of this chapter, is to create a *spanned volume*, a single disk icon (and drive letter) that's actually composed of the space from both your old and new drives.

The first order of business (after restarting the computer) is to make sure Windows has recognized the new drive. When you launch the Disk Management console, a

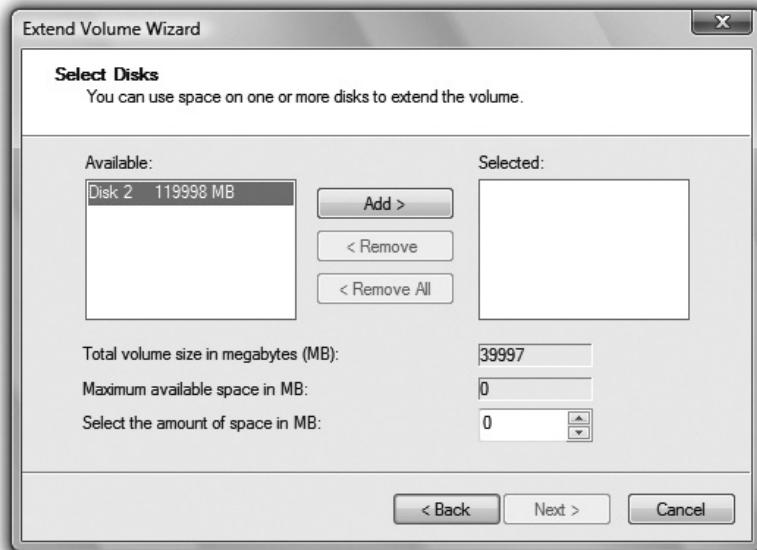


new drive appears in the list, with a great big block of unallocated space for you to fill, as shown in Figure 2.

To use the new drive to enlarge your existing volume, right-click your almost-full volume (drive E: in this example), and select Extend Volume from the shortcut menu. The Extend Volumes Wizard appears. Click Next to begin.

When the Select Disks screen appears (Figure 3), you see that the only available unallocated space in your computer is on your new drive. Select it in the Available column and click Add to add it to the Selected column. Specify how much of the new drive you want to add to the volume (or, to add *all* of it to your original drive, do nothing). Finally, click Next and then Finish.

**Figure 3:**  
*When extending a volume to another disk, click its name in the Available column before adding it to the Selected column.*



## GEM IN THE ROUGH

### Creating a New Spanned Volume

The flexibility of dynamic disks never ends. If you find yourself with bits of unallocated space on two or more dynamic disks, you can actually sweep these scraps together into a single new volume—a spanned volume—that behaves, in Windows, as though it's a single hard drive.

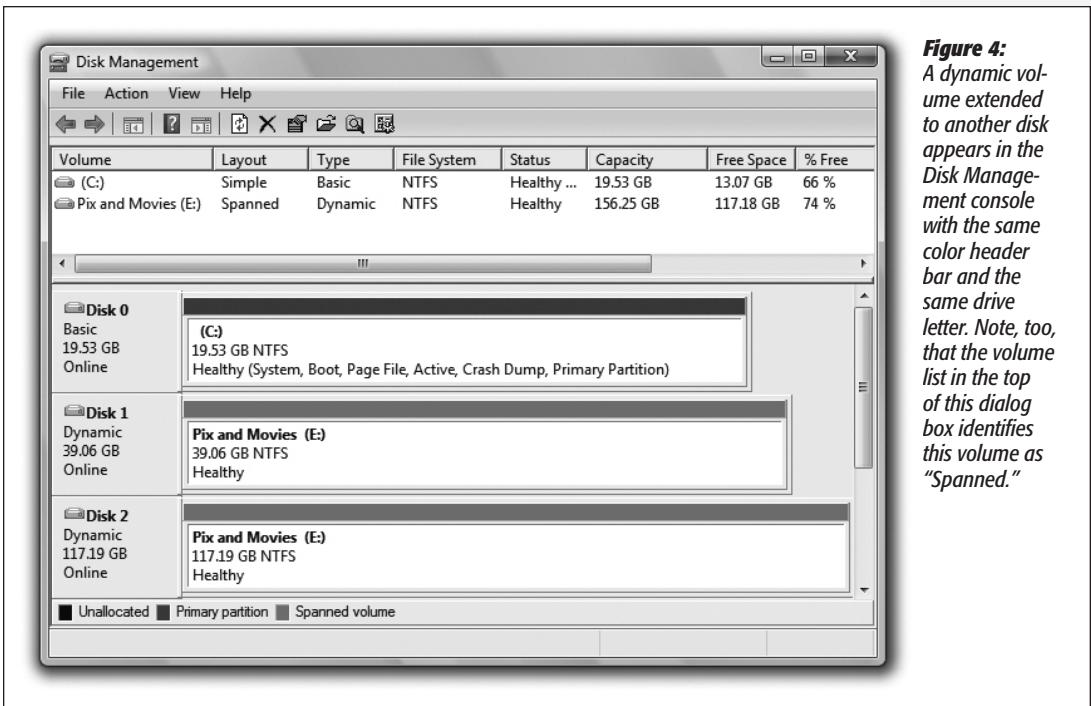
To do this, start in the Disk Management window (Figure 1). Right-click any unallocated space on any of the disks and

select New Spanned Volume from the shortcut menu. On the Select Disks screen, the unallocated space you clicked appears in the Selected column, and any unallocated space on other dynamic disks appears in the Available column. Add the unallocated space you want to use, and proceed through the wizard to create the new volume.

**Note:** This operation doesn't erase any of your existing data. Still, this sort of major change is not without risk. So now is the time to ask yourself, "Do I feel lucky?" If not, make that backup before you do something we'll all regret.

This process converts both disks into a dynamic disk and creates a spanned volume. You get a warning from Disk Management about the consequences of converting to a dynamic disk, as described earlier in this chapter. Click Yes to continue.

Notice now that your original volume and your new drive both have a purple header bar and use the same drive letter, as shown in Figure 4. You now have a spanned volume using space on both of your hard drives. Your hard drive is now effectively bigger (117 GB of free space out of a combined total of 156 GB), and you can continue to amass new files at your accustomed rate.



**Figure 4:** A dynamic volume extended to another disk appears in the Disk Management console with the same color header bar and the same drive letter. Note, too, that the volume list in the top of this dialog box identifies this volume as "Spanned."

### Creating a striped volume

As you now know, a *spanned volume* is like a virtual hard drive made up of storage space from more than one dynamic disk. When Windows saves data onto a spanned volume, it completely fills up the allotted space on one drive, then proceeds to the next drive in the volume, until the allotted space on all the drives is full.

A *striped volume* is similar, in that it's a single volume made up of space from several actual disks, but the way Windows saves data to the drives is different. Instead of filling up one drive and proceeding to the next one, Windows saves pieces of each file

on more than one disk. Because more than one hard drive is saving and reading data in parallel, a speed benefit can theoretically result.

The truth is, though, that for the sorts of small files most people work with, the differences are measured in milliseconds—thousandths of a second—so it's generally not worth creating striped volumes on everyday PC workstations. (On corporate file servers that handle hundreds or thousands of file access requests per minute, or on video-editing workstations, it's a different story. The cumulative savings in access times can be significant.)

If you're still tempted to create a striped-volume set, the process is nearly identical to creating a new *spanned* volume (see the box on page 6), except that, when you right-click, you select New Striped Volume instead of New Spanned Volume. You must also use the same amount of space on each of the drives you select. For example, if you have 100 gigabytes of unallocated space on Disk 0 and 50 gigabytes of unallocated space on Disk 1, your striped volume can be no larger than 100 gigabytes—50 from each drive.