Exploring Shadow Copies with TimeTraveler^{TM}

How to create and access useable previous versions of your files

What is a Shadow Copy?

Windows Vista, Windows Server 2008, Windows Server 2003 and Windows XP all have the ability to make Shadow Copies of NTFS Volumes. This ability is used extensively in the System Restore and Backup solutions provided by Microsoft and other software vendors. Unless you tell your system not to, it will make a Shadow Copy of your System Volume every time you install, uninstall or upgrade the software on it. These copies are called restore points and by default, they will occupy at most 15% of the volume capacity.

Actually making a shadow copy uses very little storage space, but once the copy is created, every new write to the volume creates a copy of the old data, which the write is replacing. This is called copy-on-write and it means that the size of your volume is now growing. Even if a file is replaced by one that is smaller than its previous version, the total storage in use grows. (Because the old version remains, the total storage must increase by the size of the new data.) The work of making Shadow Copies is managed by the Windows Shadow Copy Service, which in turn invokes a process including a Provider for doing the copy-on-write work. The amount of extra work taking a Shadow Copy depends on the actual implementation of this Shadow Copy Provider. The default System Provider comes from Microsoft and works independently of the hardware. However, several storage array vendors supply their own provider so that it can take advantage of the increased performance of the array.

A Shadow Copy of a Windows Volume (e.g. C:) is hidden from you and your applications unless the application knows how to access it through the Volume Shadow Service (VSS) API. Windows Explorer can do this through the Previous Versions tab on the Properties Window for a file or folder. (However, in Vista Starter, Basic or Premium, Previous Versions is missing because Microsoft left this feature out.) The Previous Versions Tab shows a list of times next to the object. This object could be a file or folder. In the screen-shot below the folder is "Pictures". As you continue to add new data to this volume, if it would cause the total storage used by the shadow copies to exceed the maximum configured, VSS will delete the older versions. Because VSS causes your usage of the volume to grow faster (sometimes much faster) than NTFS, this deletion of older copies is necessary or you might run out of space.

Looking back with TimeTraveler^{TM}

Bears on the Loose has created a Shadow Copy tool you can use to browse through the shadow copies of your volumes. As you can see, **TimeTraveler™** displays all your shadow copies as "tic marks" on a timeline at the bottom of the Explorer Window. The dark blue marks are for the copies where the selected object has changed and the light blue for the rest. As you move the yellow pointer to the different times, the contents of a displayed folder may change to display the contents at the newly selected time.
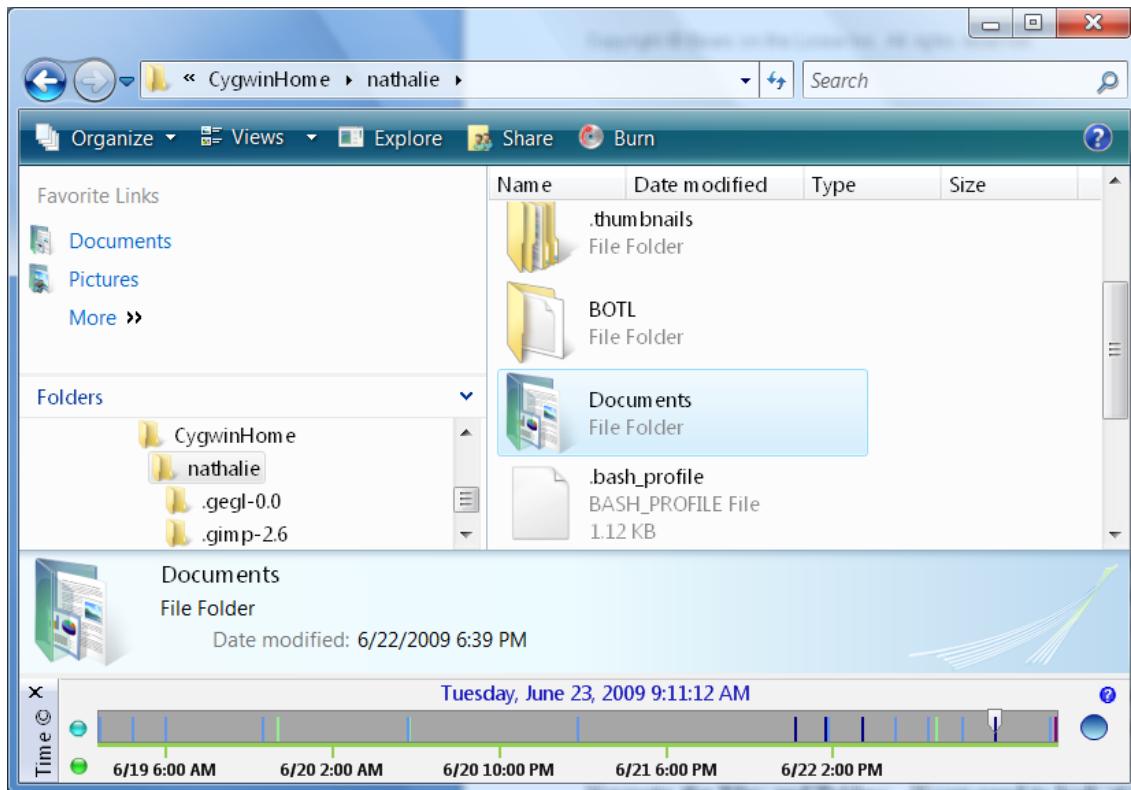
Figure 1 - Looking back with TimeTraveler

Looking back with Previous Versions

As you can see in the following picture, the previous versions tab tells you the time of each shadow copy. The shadow copies are for the whole volume. (You will see the same times no matter what file or folder you look at on this NTFS volume.) If you accidentally delete a file, you can select the parent folder with Explorer, click on the properties menu and click on the Previous Version tab of the Properties Dialog. Now you see the list of Previous Versions for the folder. The Volume may have other previous versions but Previous Versions only displays this folder's versions. The sequence of events is: 1) Navigate the Folders/Files then 2) navigate to the correct time. **TimeTraveler™** can use this scheme or the reverse: 1) Navigate the Shadow Copy Times then 2) Navigate the Files and Folders. If you need to look at the folder that contained the file because its name has changed, you can use either scheme, but it is often a lot faster to set the time you want and browse the folders. In that case you want **TimeTraveler™**.
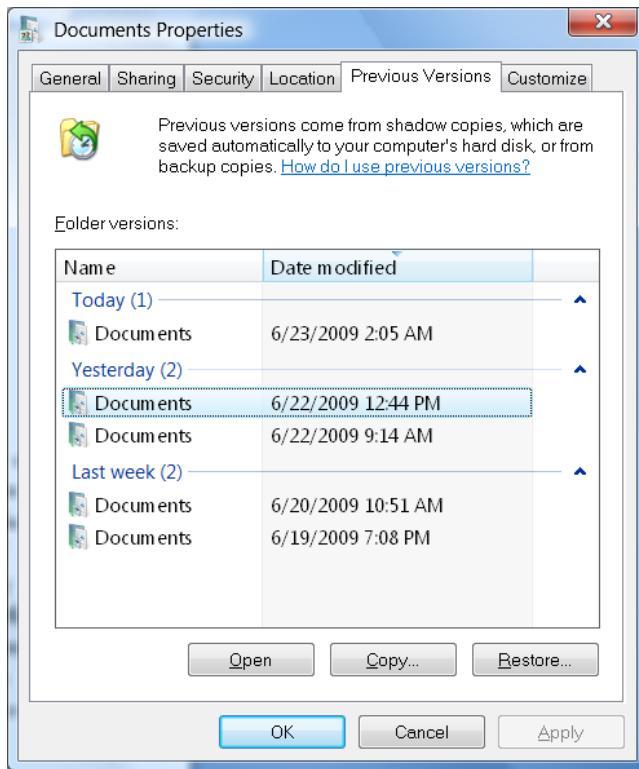
Figure 2 - Looking back with Previous Versions

Creating Shadow Copies

Vista allows you to create your own restore points by using the System Protection Tab in the System Control Panel. **TimeTraveler™** allows you to create Shadow Copies that are not restore points, by clicking on the Create button in the **TimeTraveler™** configuration screen. The **TimeTraveler™** Shadow Copies you create in this way are less intrusive than restore point creation because they do not invoke the VSS processes that require many of the Vista services and system components to flush their active cache pages. Both Vista and **TimeTraveler™** expect you to select the volume for the Shadow Copy. Managing these copies, once you have created them, is an interesting exercise. The simplest way is to accept the Vista default management settings. If you wish to have more control, you probably already own **TimeTraveler™**, because the Shadow Copy Management it provides is so much easier to use. (See Configuring the Shadow Copy Service.)   If you do not have **TimeTraveler™**, you should consider it. **TimeTraveler™**'s Shadow Copy Service Configuration is so simple; you will find yourself loving it because it puts all the needed controls onto one screen and graphically displays the current and future settings of VSS.

Bears on the Loose, Incorporated
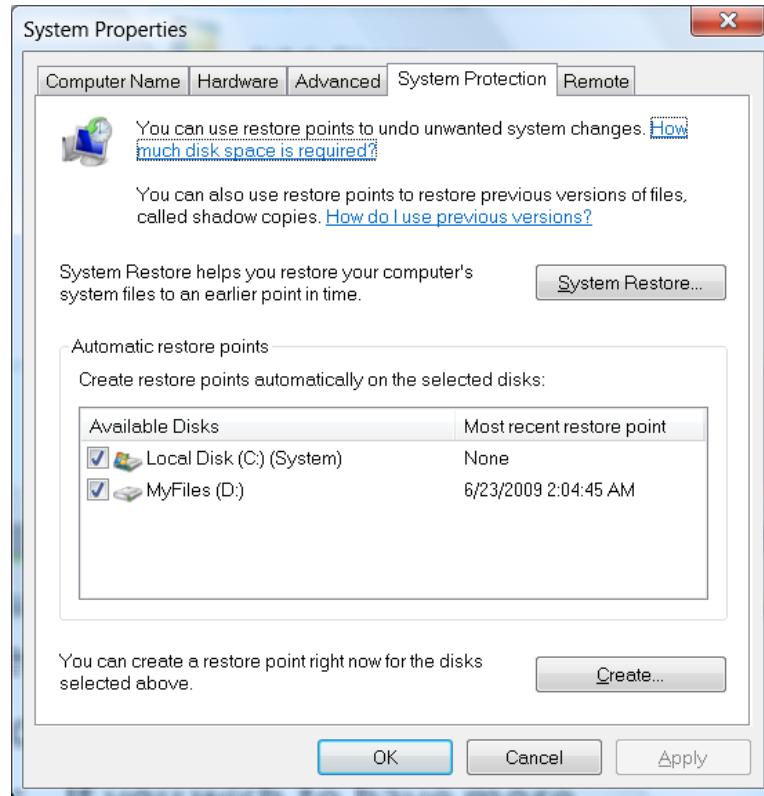
Figure 3 - Creating a Shadow Copy with System Protection
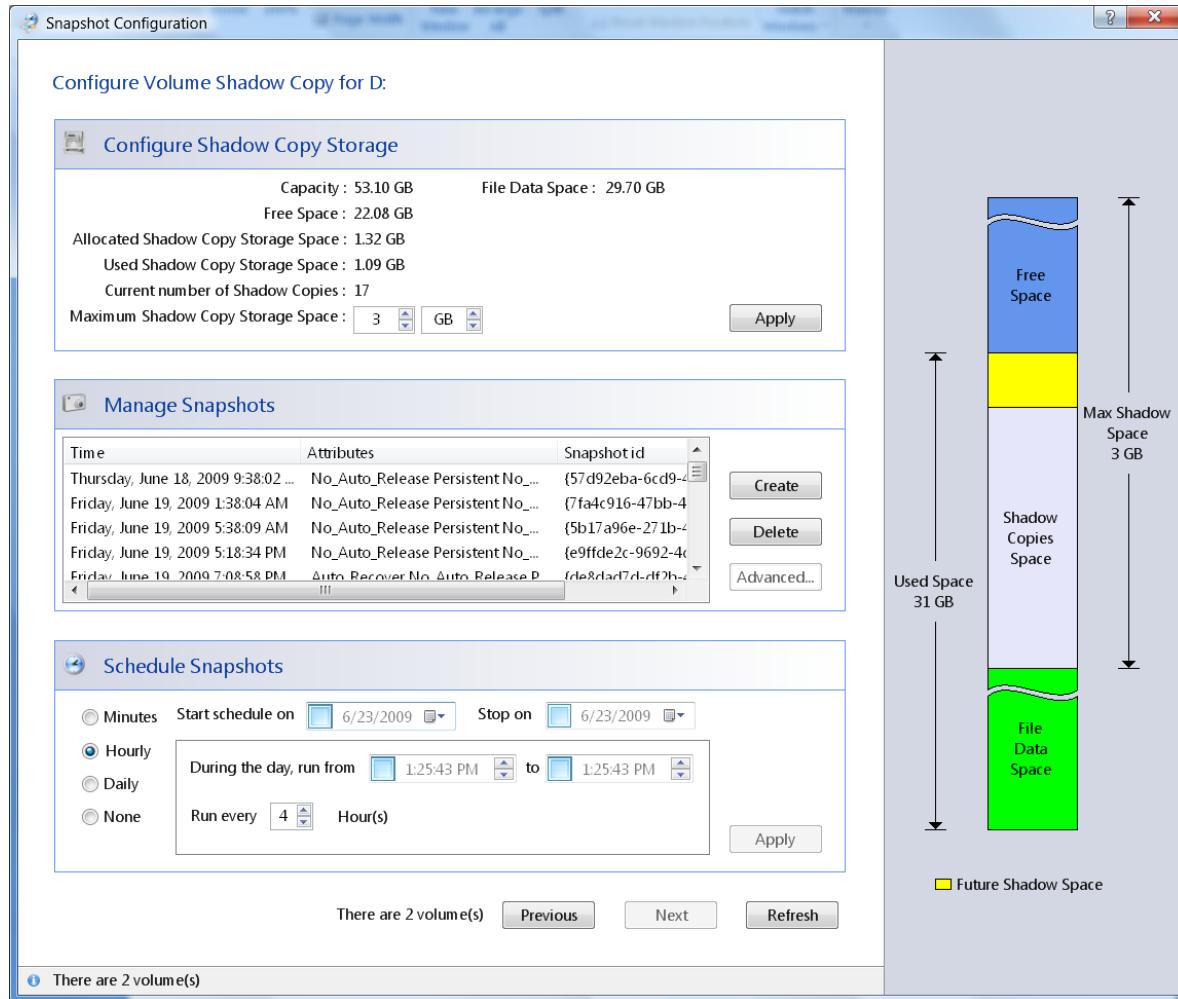
Figure 4 - Creating Shadow Copies with TimeTraveler