Achieving Continous Data Protection with a Recycle Bin for File Servers

The Essentials Series

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Limits of the Windows Recycle Bin: Improving File Recovery Options

The Windows Recycle Bin is a well-known part of the Windows file system for the PC. For many of us, it has helped recover files that should not have been deleted in the first place. We are better off with the Recycle Bin than without it. However, as much as we appreciate the Windows Recycle Bin, we have to admit there are some significant limitations.

Windows Recycle Bin Limitations

The Windows Recycle Bin is designed to work with local files that are deleted through the Windows Explorer. This design is understandable. Windows Explorer is the primary interface to the Windows OS. Unless you are a professional programmer or systems administrator with a particular knack for the command line, you probably spend most of your time interacting with the Windows OS through Windows Explorer or through an application such as Microsoft Word.

Limitation 1: Local Files

The fact that the Windows Recycle Bin is so closely linked to local files and Windows Explorer has become more of a problem for file recovery. We have changed the way we work with our devices and network them. Devices depend on shared network resources such as centralized storage systems. Rather than provide every desktop and laptop with hard drives large enough to meet peak demand capacity, you can configure devices with moderate-size local storage along with shared access to network storage. This method is a more cost effective and efficient way to manage storage.

Limitation 2: Deleting from the Command Line

Command line interfaces preceded graphical user interfaces (GUIs). Systems administrators and developers who work with command lines can become proficient in manipulating systems and applications with the command line. In some cases, it may be more efficient to execute a command from the command line than from the GUI. In other cases, you might need to perform a series of steps and the best solution is to use a batch script with all the commands. Working with the command line can be more efficient for many tasks, but you lose the ability to recover deleted files from the Windows Recycle Bin when you turn to the command line.

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Limitation 3: Application Deleted Files

In addition to deleting files through Windows Explorer and the command line, you can work with applications that manage files. Commercial off-the-shelf software, open source tools, or custom-developed applications can support a wide range of functions that interface to the OS, including deleting files. Deleting files from an application does not entail the Windows Explorer and therefore does not support recovery of deleted files from the Recycle Bin.

Limitation 4: Previous Versions of Files

Commonly used tools such as Microsoft Word, Microsoft Excel, and Microsoft PowerPoint let users create intermediate versions of files as they are working on them. These intermediate copies are versions that are typically overwritten. This is often a space efficient way to handle intermediate files but it can lead to recovery problems when accidentally overwriting a file.

For example, consider working on a set of PowerPoint slides that you save every 30 minutes. Just as you are nearing the end of your work, a colleague tells you there has been a change of plans and the slides need to be substantially revised. In frustration, you delete your current set of slides and set to work on the revised version. A few minutes into your work on the new presentation, you realize that several of the slides from an earlier version of your original presentation would fit well with the new presentation. Unfortunately, that earlier version was overwritten several times. Even though you can recover the deleted file from the Windows Recycle Bin, you only have a copy of the latest version that does not contain those early slides. Had you had copies of each of your versions, you would be able to recover the slides you needed.
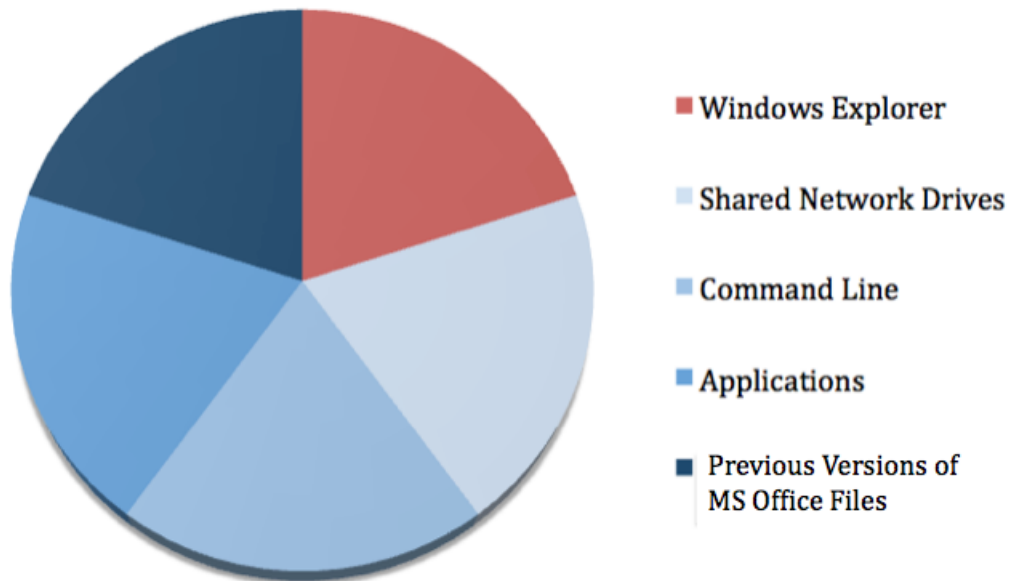

Figure 1: The Windows Recycle Bin captures files deleted from Windows Explorer but there are other ways to delete files. Third-party tools are required to protect these deleted files.

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There are many ways that files can be deleted and not captured in the Windows Recycle Bin. In order to provide some level of continuous data protection, IT support staff have to find a way to compensate for the limitations of the Windows Recycle Bin.

Beyond the Recycle Bin: Options for Data Protection and File Recovery

When users cannot recover their deleted files from the Windows Recycle Bin, they may be able to recover files using one of three other options:

- Restoring from backups
- Restoring from snapshots
- Restoring from a third-party file recovery application

These approaches lead to varying levels of protection, so it is helpful to consider the details of each.

Restoring from Backups

Backups are commonly used for data protection and disaster recovery. Organizations have many reasons to perform backups and keep backup sets, so it is a logical assumption to think you can recover deleted files from backups. Unfortunately, there are limitations and costs associated with using backups for user file recovery.

Restoring from backups can be time consuming for IT staff, especially when the user does not remember the name or location of the deleted file. Systems administrators may have to spend significant amounts of time searching backup sets. Similarities in files names can compound the problem because searching can return a large number of files that could potentially be the lost file.

There may be a delay before a systems administrator can restore a file. It is hard to imagine an IT support team with so little to do that they can immediately jump on a file recovery operation. Of course, if the file or the user is a high enough priority, then the systems administrator may stop what she is doing and focus on recovering the lost file. This task, of course, just shifts the delay from the file recovery operation to someone else's support task.

Also, the latest back up may not capture recent changes to documents or files created between backups. For example, if backups are made during the night, then the latest backed up version of a file could be close to one day old. Someone working on a file all day can make so many changes that a 24-hour-old backup may be of marginal help.

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The time delay and potential for not capturing the latest version of a file are classic problems in backups. These are known as recovery time objectives (RTOs) and recovery point objectives (RPOs), respectively. To reach something close to continuous data protection, you need to have near-time RPOs. To minimize the demand on IT support staff, you should have tools that have minimize the RTO as well.

Restoring from Snapshots

Snapshots of disks can preserve the state of a storage system at a given point in time. Snapshots can improve RPOs because snapshots can capture changes to files between backups if snapshots are performed during the day or at other times between backups. A disadvantage of snapshots is that they require increased storage and entail additional management overhead.

Recovering from Third-Party File Recovery Applications

A third alternative for recovering files is to use a third-party file recovery application. When assessing your options in this area, consider how well the tools improve over the Windows Recycle Bin, backups, and snapshots.

An ideal third-party file recovery application should back up versions of files as they are saved. Many users work with desktop applications and save their work intermittently. A file recovery tool should be able to preserve all versions of such files. Sometimes users make changes to a file that should not have been made, and you need to roll back to a previous version. A file recovery tool can help support that use case.

The third-party tool should also provide a user equivalent to continuous data protection. Back office applications, such as databases, can be configured for continuous data protection, and now you can do something similar for users working on desktops and laptops.

Of course, the third-party tool should capture files deleted outside of Windows Explorer. Files deleted from the command line and applications as well as files stored on network shared drives should be protected.

Summary

The Windows Recycle Bin is a useful data protection tool, but it has significant limitations. Files deleted from network shared drives or from outside of Windows Explorer are not protected, nor are intermediate versions of files. Users and systems administrators have made do with the file recovery features of backups and snapshots, but third-party file recovery applications are providing an improved alternative.

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