

Why Do Microsoft Products Create Those Temp Files? Everything You Wanted to Know . . .

[See KB Article ID: 211632](#)

This article explains when, where, and how Microsoft Word for Windows creates temporary files. See also KB Article ID: 316951 about *.asd and AutoRecover files.

Definition of a temporary file

A temporary file is a file that is created to temporarily store information in order to free memory for other purposes, or to act as a safety net to prevent data loss when a program performs certain functions. For example, Word determines automatically where and when it needs to create temporary files. The temporary files only exist during the current session of Word. When Word is shut down in a normal fashion, all temporary files are first closed and then deleted.

Why does Word create temporary files?

Speed

If there is not enough memory available to keep the document with all its edits in memory and still perform manipulations such as sorting, dragging, scrolling, and so on quickly along with any other applications that are running, then Word moves part of its code that is not being used or part of the document that is not being edited from memory to disk. This movement to temporary files on disk frees more memory for text manipulation or storage of the parts of the document that are being actively edited.

Data Integrity

Word uses temporary files as a “safety net” to protect against system errors in its file-saving scheme. By saving to a temporary file first and then renaming the file to the proper name, Word ensures the data integrity of your original file against problems (such as a power failure or lost network connections) that may occur while the file is being written.

Types of temporary files

MS-DOS-Based File

These are standard MS-DOS files.

Document-File-Based File

The difference between this file and a traditional MS-DOS file is that multiple programs can read and write to these files without the original owner knowing about it. Additionally, document files have inherent properties that allow Word to create files and directories within files. At startup, Word creates one temporary (direct) document file called **~wrfxxxx.tmp**. You can determine that it is a document file because the initial size is 1,536 bytes. This temporary document file is used to store all OLE objects that belong to unnamed documents, Undo, the Clipboard, and documents whose native formats are not document format (for example, .txt, .rtf, and Word 2.0 documents). Word can open document files using two different modes: transacted and direct. These modes are discussed later in this article.

Transacted Document Files

Transacted files allow Word to open a file, write to it, and have other programs—such as Microsoft Excel—write to it, but still retain the right to restore the file to the state it was in when Word first opened it.

To do this, the document file creates ghost images (typically ~dftxxxx.tmp) of all the changes made to the file after it was opened; if Word keeps all the changes, the contents of ~dftxxxx.tmp merge with the original file, and then saves a complete version of it. Conversely, if Word discards all changes, then ~dftxxxx.tmp is deleted, and the original file does not change. Word opens all of the Word native files using transacted files, which create ghost images in the Temp directory. When you start Word, Normal.dot is typically opened in transacted mode, and a ghost file is created for it called dftxxxx.tmp. FastSave, for example, merges these two files when a save occurs.

Direct

Word uses direct storage when opening the temporary document file and when performing either a Save As or a Full Save (non-FastSave save). This type of file is a low (if any) consumer of memory and does not create a ghost image when created or opened.

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Specific files that Word creates

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A simplified view of the scheme used to save an edited file

Create temp file Create ~wrdxxxx.tmp

Write temp file Save example data to ~wrdxxxx.tmp

Delete original file Delete EXAMPLE.DOC

Move temp to target name Move ~wrdxxxx.tmp to Example.doc

Word gains significant performance speed by placing the temporary file in the same directory as the saved file. If Word placed the temporary file elsewhere, it would have to use the MS-DOS COPY command to move the temporary file from the other directory to the saved location. By leaving the temporary file in the same directory as the saved document file, Word can use the MS-DOS MOVE command to quickly designate the temporary file as the saved document.

When and where Word creates temporary files

The location where Word creates the temporary files is hardcoded information and cannot be edited. Therefore, it is important that NTFS permissions for the user are set accordingly. For more information, click the following article number to view the article in the Microsoft Knowledge Base: 277867 (<http://support.microsoft.com/kb/277867/>) Windows NTFS permissions are required when you run Word on any NTFS partition that has Windows 2000, Windows XP Professional, Windows Server 2003, or Windows Vista installed

In general, Word creates temporary files for the following types of data.

Embedded Word Objects (Temp Directory)

When Word acts as an OLE server program, the embedded Word objects are stored as temporary files in the Temp directory.

OLE 2.0 requires extra drive storage. When you start OLE programs, Word needs to provide copies of the data to the server. It is not unusual for extensive OLE 2.0 usage in a single session of a program to accumulate a large amount of temporary storage on the hard drive.

Scratch File (Temp Directory)

When Word runs out of internal random access memory (RAM), it always creates a single temporary scratch file in the Temp directory to hold information. This scratch file holds information that is swapped out from the Word internal file cache, which is allocated from global system memory. The scratch file varies in size from 64 kilobytes (KB) to 3.5 megabytes (MB).

The default cache size in Word is 64 KB.

For more information about how to increase the cache size in Word, click the following article number to view the article in the Microsoft Knowledge Base:

212242 (<http://support.microsoft.com/kb/212242/>) Where settings are stored in the registry for Word 2000

Recorded Macro (Temp Directory)

When you record a macro, Word creates a temporary file in the Windows Temp directory.

Converted Files (Temp Directory)

The word processor converters supplied with Word create temporary files in Rich Text Format (RTF), which Word uses to access specific converters.

Locked Files (Temp Directory)

When you open a file that is locked, either because it is open in another window of Word or because another user on the network has it open, you can work with a copy of the file. Word places this copy in the Windows Temp directory. Likewise, if a template attached to a document is locked, Word automatically makes a copy of the template in the Temp directory. The copy of a locked file does not automatically update the original owner's file.

Saved Files (Same Directory as the Saved File)

When you click Save on the File menu, the following happens:

Word builds a new temporary file using the edited version of the document.

After Word creates the temporary file, Word deletes the previous version of the document.

Word renames the temporary file to the same name as the previous version of the document.

Text Pasted Between Files (Same Directory as Source File):

When Word copies and pastes between documents, it may create a temporary file in the same

directory as the source file. This is especially true if the source file is saved or closed. The temporary file represents the information that was referenced by the Clipboard prior to saving the file. Word creates this temporary file by renaming the old copy of the file to a temporary file name.
Owner File (Same Directory as Source File)

When a previously saved file is opened for editing, for printing, or for review, Word creates a temporary file that has a .doc file name extension. This file name extension begins with a tilde (~) that is followed by a dollar sign (\$) that is followed by the remainder of the original file name. This temporary file holds the logon name of person who opens the file. This temporary file is called the "owner file."

When you try to open a file that is available on a network and that is already opened by someone else, this file supplies the user name for the following error message:

This file is already opened by user name. Would you like to make a copy of this file for your use?

Word may be unable to create an owner file. For example, Word cannot create an owner file when the document is on a read-only share. In this case, the error message changes to the following error message:

This file is already opened by another user. Would you like to make a copy of this file for your use?

Note Word automatically deletes this temporary file from memory when the original file is closed.

When you open a file by using the HTTP or FTP protocol, the file is first copied to the temp directory. Then, the file is opened from the temp directory.

When you open a file on a UNC share with Word 2007, the file is first copied to the temp directory. Then, the file is opened from the temp directory.

Automatic Save

Word Auto Recover Save Directory

The temporary file that is created when Word performs an automatic save is stored in the Temp folder, unless there is not a valid Temp folder. In this case, Word saves the temporary file in the same folder where it saves the document.

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The location of temporary files when you close a file

Word may occasionally have to maintain a link to a file after it is closed. This occurs when text has been copied to the Clipboard from the file. When you close a file, Word attempts the following actions:

If the selection that was copied to the Clipboard does not contain multiple sections or a picture, or is not large, Word copies the piece of the document to the scratch file.

If the copied selection does contain pictures or multiple sections, or if the file is on a floppy disk, Word copies the entire file to the Temp directory and moves the pointer there.

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