Reducing the Disk Footprint for Windows 7 Hibernation

September 15, 2009

Abstract

This paper provides information about the disk footprint that is associated with hibernation on Windows® 7 and Windows Server® 2008 R2 systems. It describes how to configure how much disk space is reserved for the hibernation file and explains the default hibernation policies for Windows 7 and Windows Server 2008 R2 systems.

The paper provides guidelines for system manufacturers to set the appropriate hibernation file size in the pre-installation image.

This information applies to the following operating systems:
 Windows Server 2008 R2
 Windows 7

References and resources discussed here are listed at the end of this paper.

The current version of this paper is maintained on the Web at:
<http://www.microsoft.com/whdc/system/pnppwr/powermgmt/HiberFootprint.docx>

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Document History

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# Introduction

Windows® platforms support saving memory and device context on the disk in a process that is known as *hibernate* or *hibernation*. Hibernation helps extend usable battery life on mobile PCs by saving the user’s open programs and documents on the disk and powering off the computer. During hibernation, the computer consumes no power, but the user’s state is preserved until the computer is powered on again.

Windows supports hibernation by copying the contents of memory to disk. The system compresses memory contents before preserving them on the disk, which reduces the required disk space to less than the total amount of physical memory on the system.

Windows reserves disk space for hibernate in the hibernation file, which is named Hiberfil.sys. For Windows 7, the default size of the hibernation file is equal to 75 percent of the total physical memory on the system. For example, on a computer that has 2 GB of RAM, the default hibernation file size is 1.5 GB.

In rare and extreme cases of memory use, including memory validation by a memory performance or test utility, hibernate can fail because the contents of memory cannot be compressed enough to fit within the size of the hibernation file.

System manufacturers can adjust the size of the hibernation file in their Windows 7 pre-installation images by using the built-in PowerCfg command-line utility. On systems with large disks, where saving disk space by reducing the hibernation file size is not critical, manufacturers should increase the hibernation file size to 100 percent. This setting can help improve system reliability by ensuring enough hibernation file size for extreme memory use workloads.

# Default Hibernation File Size

Windows 7 sets the default size of the hibernation file to 75 percent of total physical memory. We chose this default by evaluating common workloads and their memory use during the development of Windows 7. Windows compresses the contents of memory during the hibernate process to minimize the possibility that the contents exceeds the default size of the hibernation file.

Reducing the hibernation file size from 100 percent of total physical memory helps reduce the disk footprint that is associated with hibernate and frees disk space for user programs and data. This reduction is very important on systems that have limited disk capacity.

However, some rare workloads have a memory footprint that is larger than 75 percent of the total physical memory on the system, even when they are compressed. A system administrator can adjust the size of the hibernation file to as high as 100 percent of total physical memory to account for these conditions.

In Windows Server® 2008 R2, hibernate is disabled by default. The Hiberfile.sys file does not exist until the administrator enables hibernation on the computer. If the administrator enables hibernation without specifying the size of the hibernation file, the hibernation file size is 100 percent of total physical memory.

# Configuring the Hibernation File Size

To configure the size of the hibernation file, use the PowerCfg command-line utility that is included with Windows 7 and Windows Server 2008 R2. You must run PowerCfg from an elevated command prompt and include the **/HIBERNATE** and **/SIZE** parameters, as follows:

C:\>PowerCfg.exe /HIBERNATE /SIZE *percentage*

Specify the size of the hibernation file as a percentage of total physical memory. By default, on a system with 4 GB of physical memory, the hibernation file is 3 GB or 75 percent of total physical memory. You can confirm the size by checking the size of Hiberfil.sys in the root directory of the system drive. The system drive contains the Windows installation and is defined by the %SystemDrive% environment variable.

You can configure the hibernation file to a size between 50 and 100 percent of physical memory. We do not recommend sizes smaller than 75 percent of total physical memory for production or retail systems.

To configure the hibernation file size to 100 percent, use the following command:

C:\>PowerCfg.exe /HIBERNATE /SIZE 100

To configure the hibernation file size to 75 percent, use the following command:

C:\>PowerCfg.exe /HIBERNATE /SIZE 75

To disable hibernate for the system, use the **/HIBERNATE** parameter with the “off” value:

C:\>PowerCfg.exe /HIBERNATE off

To re-enable Hibernate with a file size equal to 75 percent of total physical memory, use the **/HIBERNATE** and **/SIZE** parameters:

C:\>PowerCfg.exe /HIBERNATE /SIZE 75

# Hibernation Failure Caused by Insufficient Hiberfile Size

If Windows fails to hibernate because the hibernation file is too small, a Stop error occurs and the following message appears:

STOP 0x000000A0 INTERNAL\_POWER\_ERROR

*Parameter 1*

*Parameter 2*

*Parameter 3*

*Parameter 4*

The parameters provide the following information:

* *Parameter 1* is always equal to 0x0000000B.
* *Parameter 2* is equal to the size of the hibernation file in bytes.
* *Parameter 3* is equal to the number of bytes of data that remain to compress and write to the hibernation file.
* *Parameter 4* is unused for this error.

# Guidelines

System manufacturers should configure the hibernation file size appropriately in their pre-installation images.

We recommend the following guidelines:

* For systems with large system drives, configure the hibernation file size to 100 percent of physical memory.
* For systems with system drives that are 16 GB or less, configure the hibernation file size to the default value of 75 percent.

# Resources

Powercfg Command-Line Options
http://technet.microsoft.com/en-us/library/cc748940(WS.10).aspx