

Unique Differences between PerfectDisk® 10 and Windows® Built-In Disk Defragmenter

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Introduction

This paper provides an overview of the differences between PerfectDisk® and the Windows® defragmenter based on key areas of functionality and defragmentation methods. The process of comparing two utilities that have a high-level similarity in functionality (i.e. disk defragmentation) is not necessarily a case of comparing “apples to apples,” as the two utilities’ philosophies and strategies differ substantially in many cases.

The goal of this paper is to highlight key areas of functionality, which the reader can use as a basis for his or her own analysis.



Performance

The difference in philosophies used by PerfectDisk and the Windows defragmenter are made clear here. PerfectDisk’s single pass method addresses both Read and Write performance which is crucial for business machines. PerfectDisk is designed to work on drives in very poor health and improve performance on desktops, laptops and servers, including SQL Database, File and Storage servers - while using minimal resources.

Single Pass Defragmentation

PerfectDisk employs a single-pass defragmentation engine that is designed to immediately address the issue of file and free space fragmentation – providing the best possible drive performance when run. This means PerfectDisk will defragment 99-100% of all data files and consolidate free space in one run regardless of the severity of fragmentation or the amount of free space.

The Windows defragmenter is the same for workstation and server and is a multi-pass defragmenter. Gartner Research published a report making this observation about multi-pass defragmenters:

“The Windows built-in defragmentation tool is a multi-pass defragmenter that must be run over and over to defragment the disk, especially when defragmenting very large disks with heavy fragmentation and limited free space. As such, multi-pass defragmenters characteristically fragment the remaining free space on the disk, which accelerates fragmentation later. It is recommended that a third-party single-pass server defragmentation tool be implemented instead.”

Total Free Space Consolidation

With PerfectDisk’s advanced Space Restoration Technology™, in the same single pass that PerfectDisk defragments files it also consolidates the available free space on the drive into the largest possible pieces, which improves drive write performance. As the Gartner report states, fragmented free space accelerates new file fragmentation. PerfectDisk provides statistics on free

space fragmentation so you can actually see PerfectDisk addressing this vital drive performance issue.

Since the Windows defragmenter is a multi-pass defragmenter which does an inefficient job of defragmenting files and consolidating free space, any moderate amount of file write activity will result in new files being created in a fragmented state – slowing down disk write speed and causing an immediate fragmentation issue for these new files.

SMARTPlacement™ Optimization Strategy

PerfectDisk has a patented file placement strategy that is based on file modification activity. This strategy groups files with similar modification patterns together. When all “rarely modified” files (files that haven’t changed in 60 days) are grouped together, the next time PerfectDisk runs, it is very likely nothing in this file group has changed. The files are already contiguous so PerfectDisk leaves them alone.

The “recently modified” files (created or changed in 30 days) are adjacent to the contiguous free space. If one of these files grows the fragment will be created in one piece from the contiguous free space. This file can be made contiguous with minimal shuffling of clusters. As a result, less frequent defrag passes are actually needed and subsequent defrag passes take less time, CPU, and memory. PerfectDisk implements SMARTPlacement™ during its single pass on the disk. This means that in one pass with PerfectDisk you get 99-100% of all data files defragmented, free space consolidated, and intelligent file placement based on a sound strategy.

PerfectDisk’s patented SMARTPlacement file placement technology is the only proven and patented method to provide the absolute best in drive performance. SMARTPlacement is available in all PerfectDisk components. With PerfectDisk, you don’t have to pay a premium price to get the best possible drive performance.

The Windows defragmenter has no file placement strategy to slow down the rate of refragmentation, speed up future defrag passes or consolidate free space to improve write performance.

Administrative Rights

PerfectDisk does not require that end users have Administrative rights in order to run.

The Windows defragmenter requires Administrative rights in order to run. In most corporate environments, end users are not given Administrative rights.

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Through AutoPilot Scheduling™, PerfectDisk provides flexibility and control so that defragmentation occurs on your terms - when you want it to.

Automating Defragmentation

Through AutoPilot Scheduling™, PerfectDisk provides flexibility and control so that defragmentation occurs on your terms - when you want it to. With PerfectDisk, you have maximum flexibility on controlling defragmentation activity.

With the Windows defragmenter, robust and flexible scheduling is not available. The Windows defragmenter can be run manually or via scripting and doesn't allow you the flexibility to control access to CPU or Disk resources in order to dedicate additional resources to improve defrag performance on must-defrag systems.

Centralized Management Console

Enterprise management of PerfectDisk is provided by the Enterprise Console. The PerfectDisk Enterprise Console can be used to deploy, configure, patch, manage, and report. Other capabilities include:

- A digital dashboard that provides a visual overview of fragmentation in your enterprise
- Custom define groups and only see those computers that are to be managed; if an administrator only manages computers, the administrator won't have to see others that are not managed
- Automatic email notification if thresholds are reached, sent as they occur or in a daily summary
- 11 user-configurable warnings and alerts for problematic situations across the enterprise
- Remote control via an automatically generated hotlink to the PerfectDisk Client running on a remote computer
- System management ability via an automatically generated hotlink to terminal service/remote desktop on the remote computer without leaving the PerfectDisk Enterprise Console, saving troubleshooting time
- Access to PerfectDisk client statistics from the PerfectDisk Enterprise Console, allowing administrators access to the data for trending and reporting purposes
- Scripting via Windows Script and WMI for additional management/administration.

PerfectDisk can also be deployed and configured using Active Directory® Group Policy Administrative Templates. As a new computer is added to an OU, PerfectDisk can be automatically installed and configured. Using GPO, you can also control what users have access to PerfectDisk features.

The Windows defragmenter provides no mechanism for enterprise management and control.

PerfectDisk provides the ability to defragment when the Windows Screen Saver is active, only when the system is idle (StealthPatrol™), or at defined date/time.

Background/System Idle Processing

PerfectDisk minimizes the impact of defragmentation on system resources by allowing it to run at a low CPU priority and to throttle Disk I/O usage. This allows PerfectDisk to get access to the resources that it needs in order to defragment while not imposing a noticeable impact on the system. For most defrag systems with system resource constraints, you can also configure PerfectDisk to run at a higher CPU priority or to not throttle Disk I/O usage to ensure that PerfectDisk gets sufficient access to system resources in order to defragment. PerfectDisk provides the ability to defragment when the Windows Screen Saver is active, only when the system is idle (StealthPatrol™), or at a defined date/time.

The Windows defragmenter provides only manual operation or if Vista/Windows 7, a defined schedule option.

Free Space Requirement

All defragmenters require some free space to defragment. The Windows defragmenter requires 15% free space in order to effectively defragment. PerfectDisk needs only a minimum of 1% available free space.

Users should perform their own testing in low free space conditions to verify results in their own environment.

Volume Shadow Copy Service (VSS) Capability Mode

On Windows systems, defragmentation activity can result in snapshots/shadow copies being purged ([Microsoft KB article 312067](#)). If the drive is formatted with a 16k cluster size (or multiple of 16k), then VSS can detect defrag activity and minimize the purging of snapshots/shadow copies. On VSS enabled drives where the cluster size is < 16k, to minimize snapshot/shadow copies being purged you need to minimize the amount of file movement when defragmenting. By default, PerfectDisk addresses this issue with VSS compatibility mode.

The Windows defragmenter has no VSS compatible mode which means that if it is run on a VSS-enabled drive; snapshots/shadow copies may be purged.

File/Folder Exclusion

PerfectDisk provides the ability to exclude files/folders from defragmentation. This may be important if whole drive encryption (WDE) software is installed as there may be certain files that should not be defragmented.

The Windows defragmenter does not provide the ability to exclude files/folders.

Directory Consolidation Online

PerfectDisk provides directory consolidation to further improve drive performance.

With the Windows defragmenter, directory consolidation is not performed.

Designed for Disks of Several Terabytes

PerfectDisk was the first defragmenter to support large drives of several terabytes that are now common. Available with all editions of PerfectDisk (including Professional and Home), PerfectDisk is designed to defragment these large drives quickly while using minimal resources.

The Windows defragmenter is designed for simple drives. It is not designed to quickly or efficiently defragment large drives, drives containing a large number of files or drives that are low on free space. All PerfectDisk editions support unlimited drive sizes. This means that even PerfectDisk Professional and PerfectDisk Home will allow you to defragment multi-terabyte drives with millions of files and very low free space.

NTFS Metadata

PerfectDisk defragments all of the NTFS metadata files. These are the files that define the file system to NTFS. You can see a list of these files in PerfectDisk by clicking on the Excluded Files tab in the Statistics windows that appears after a partition analysis. PerfectDisk defragments all of these during the system file (boot time) defrag.

The Windows defragmenter does not defragment these files and will not even report on these files.

Page File/Hibernate File Defragmentation

The PerfectDisk System File defrag will completely defrag the page file and hibernate file as long as there is a minimum of 1% free space available on the partition.

The Windows defragmenter has no boot time defrag and so is unable to defragment the page file or hibernate file.

Selected Files Defrag

PerfectDisk allows users to specify one or more individual files to defragment, rather than an entire drive. This is particularly useful for large files such as video or movie files.

The Windows defragmenter has no single file defrag capability.

Consolidate Free Space Defrag

Part of PerfectDisk's Space Restoration Technology, this method creates the largest pieces of contiguous free space available.

PerfectDisk allows users to specify one or more individual files to defragment, rather than an entire drive. This is particularly useful for large files such as video or movie files.

This is useful prior to creating large files or in performing partition resizing operations. It is also useful prior to compressing a virtual hard drive on a virtual machine, as a larger amount of disk space will be recaptured from the virtual hard drive.

The Windows defragmenter has no specific consolidate free space defrag capability.

GUI-less Installation

PerfectDisk can be installed without the GUI present on the user's machine. This feature is made available for those installations exercising a "locked down", secured environment. Only the administrator can schedule or initiate defragmentation.

The Windows defragmenter does not offer this capability.

User-Defined Thresholds

PerfectDisk has thresholds that will skip a defragmentation pass if fragmentation does not exceed a user-specified percentage, thus saving system resources. Thresholds can be applied on a partition-by-partition basis.

The Windows defragmenter does not support fragmentation thresholds.

Summary

PerfectDisk and the Windows defragmenter contain many differences in functionality, strategies and methods. Evaluators of the products are encouraged to use this paper as a guide for their own testing and analysis. By digging deep into actual functionality and actual results, testers should be in a better position to make a well-informed decision.

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