



Diskeeper® - The Number One Automatic Defragmenter™

## Benchmarking Diskeeper's I-FAAST™

### OVERVIEW





Diskeeper 10 introduces breakthrough **I-FAAST™** technology (Intelligent File Access Acceleration Sequencing Technology), poised to revolutionize data access performance on Windows® platforms worldwide. This new technology adds even greater performance gains than previously available through defragmentation alone, improving file access and creation up to an additional 80%, with typical added gains between 10-20%.

Using specially-engineered benchmarks, I-FAAST learns disk performance characteristics, and in accordance with transparent volume-level monitoring, applies proprietary techniques to organize frequently used files and applications to increase access performance. Like other intelligent technologies featured in Diskeeper 10, I-FAAST can automatically adapt to changing usage patterns—so there's no need to reconfigure if the system is reassigned to another purpose.





I-FAAST was designed specifically for real world environments where data is a heterogeneous mix of often used or "Hot" files, and stale or duplicate and unused data. In real world scenarios, it is also true that data goes through "hot and cold" phases, and that a significant amount of data is, or must be kept, for regulatory or archival purposes; often intermixed on active storage media. All these and other common scenarios are integrated into I-FAAST's heuristic algorithm.

This document is designed to provide System Administrators/IT Analysts formal methodologies to test the benefits of I-FAAST using popular independent software tools. A sample test case following these procedures is included in this document and verifies product claims of 10-20% performance increase (sample case resulted in **20% performance gain**<sup>i</sup>).

This document provides:

-  A test scenario that is easy to identify and prepare.
-  Establishment of "real world" environments.
-  Incorporation of procedures that are reproducible with minimal of effort.
-  Use of non-proprietary test tools

The initial problem to resolve is creation of a sample storage volume that represents a real world scenario. In order to meet this requirement the following criterion were established:

-  It should be 50 to 70 percent full.
-  It should have an appropriate assortment of aged and sized files.
-  It should have a lot of "normally" fragmented files.
-  It should be a regular disk drive, not a small volume or partition on a very large disk drive.

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<sup>i</sup> A sample test was performed by applying the procedures outlined in this document.





## TEST METHODOLOGY

### Test Environment:

#### Workstation 1:

Microsoft Windows XP Professional  
64bit 3.4 MHz AMD Athlon CPU  
1 GB of RAM.

#### Third Party Tools used:

-  A reasonable<sup>ii</sup> sized hard drive (the sample test case uses a Western Digital 15 GB EIDE)
-  **ReadFile** test tool (© Gilles Vollant Software, 1999)
  - <http://www.winimage.com/readfile.htm>
-  **Sophisticated Rename** file attribute setting utility (© Acritum Software, Anatoliy Kovalenko)
  - <http://acritum.com/sr/>
-  **Acronis True Image** (Disk Imaging)
  - <http://www.acronis.com/enterprise/products/choose-trueimage/>

### Test Setup Summary:

#### 1. Configure the hardware

A relatively small hard disk has been chosen so that the time needed to create data for testing can be reduced.

Test procedures applied in this document follow the guidelines laid out by VeriTest on the PC Magazine sponsored website: <http://www.veritest.com> for NetBench<sup>iii</sup>, the standard for server performance testing.

Essentially these instructions mandate a clean environment using only the test files that will actually be tested. No other network traffic or application can be allowed to interfere with the results.

#### 2. Preparing Test Data

In order to simulate a real world environment that approximates a storage volume that that has been in service for a year, there must be numerous files of many different sizes. There should be many directories and the “aging” of the files should represent a typical file system in use on a daily basis by many users. The disk drive will be about 50 to 70 percent full.

This document will outline a simple method to accomplish this in less than an hour’s worth of work. Basically the Windows\System32 directory containing over 2000 files is copied to a test area named “Dir1”. These files total about half a gigabyte. The **Sophisticated Rename** tool is used to rename all of the files something like “Dir[n]Test\_002.tst. This handy file management tool will increment the number of each file (the 002) and also allow setting the date and time and all attributes. It does all 2000 files in a minute or so. The procedure is repeated 20 times creating a new directory each time. Dir1 can have DirA.. B.. C under it each with 500 MB of data. Then that suite of folders can be copied to Dir2 duplicating all the subfolders (see Figure A below). It is a relatively quick process. With this methodology, any model can be created in half an hour or so. Several hundred gigabytes test cases can be created if large-volume scenarios are desired.

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<sup>ii</sup> A smaller hard drive is used to decrease the length of time to carry out the test. Larger disks can be readily substituted, but will lengthen volume preparation time.

<sup>iii</sup> Distribution, support and development of NetBench software have been discontinued, but the guidelines used still exist.

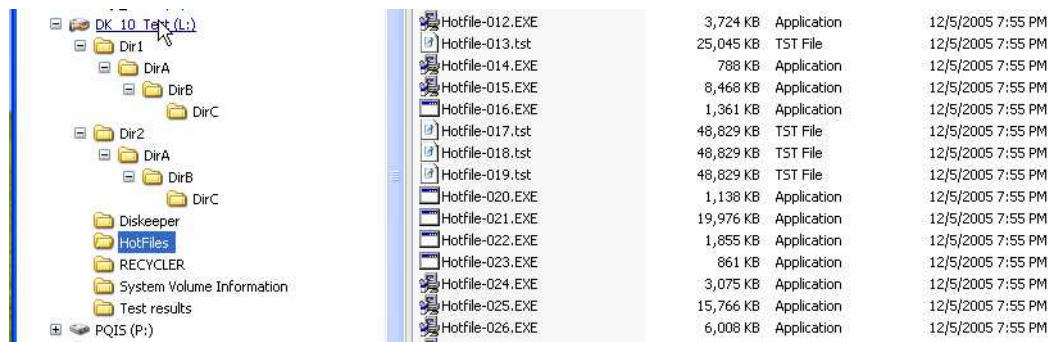


Figure A

### 3. Aging of Data

Typically, a file server with a years worth of data on it will be fragmented and aged. Fragmentation can be created by alternately compressing and decompressing directories of files and moving them around. Aging can be reproduced by using the **Sophisticated Rename** tool to set 40% of the files on the hard disk to be a year old, or any age that properly approximates the desired environment (see Figure B below). After a year of service in a typical real world environment, at least half of the data will be over 6 months old and rarely accessed.

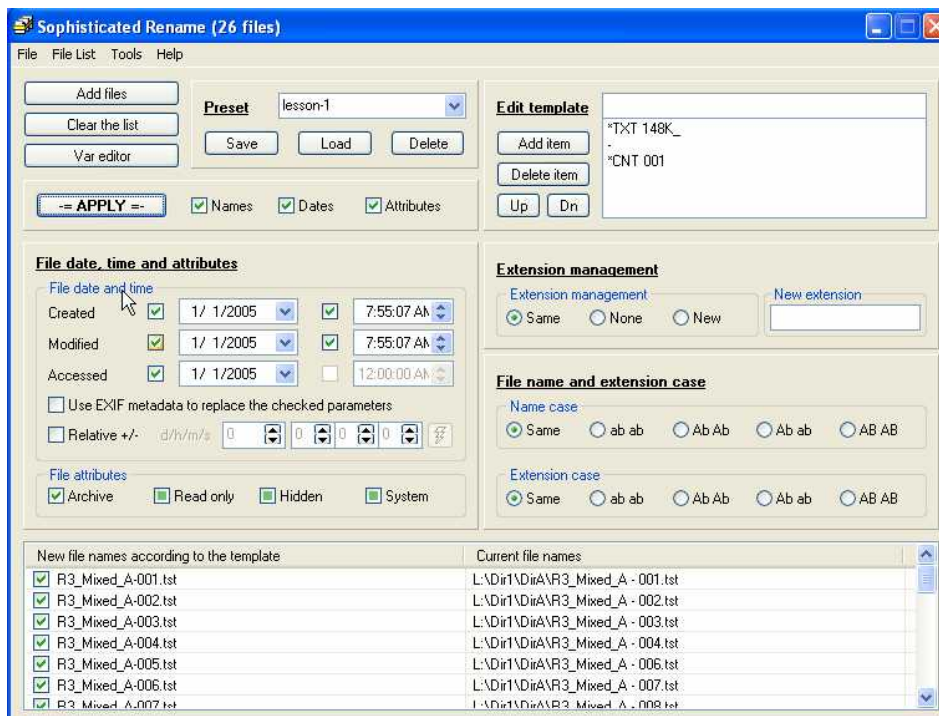


Figure B

### 4. "Hot Data" Preparation

It is typical that, on average, between 5 or 10 percent of the data will be actively accessed many times per day. After an appropriate mix of directories and files are prepared, it is important to select a set that have been written to the drive most recently. This is important because frequently accessed data will often be that data written today or yesterday. This calls for selection of a directory collection and renaming it to "HotData", setting all the files time and date stamps to the current day using **Sophisticated Rename** (see Figure C below).

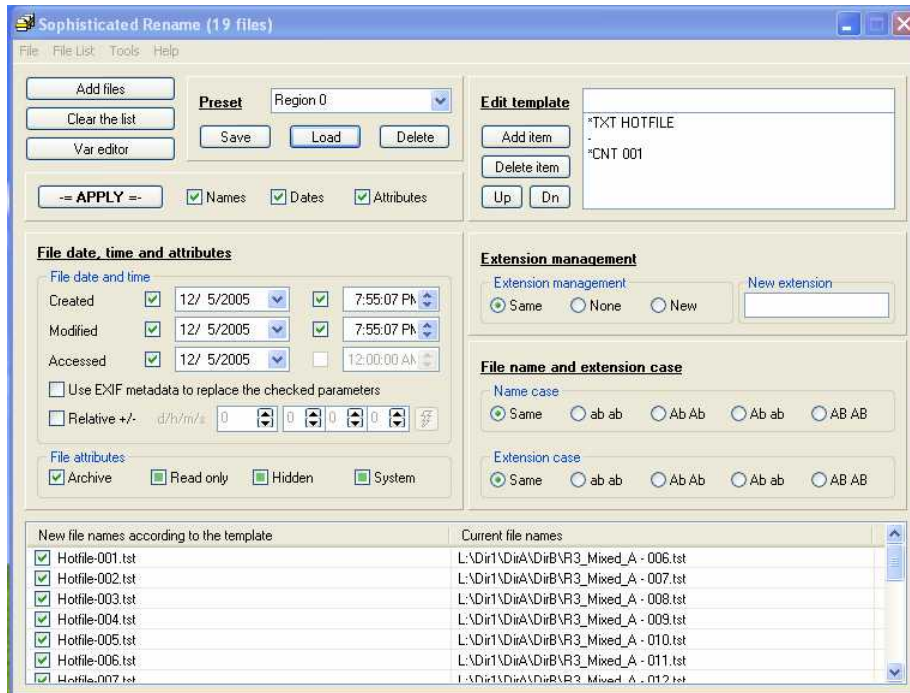


Figure C

### 5. Examination, Confirmation and final Preparation

Quickly look over all the directories and confirm the mix of files and dates are as expected. Install Diskeeper 10 now and perform a few preparatory steps to simulate Diskeeper 10 having monitored file usage for a period of time. DK 10 I-FAAST will then learn how to organize the test data, specially treating the “Hot Files” with its proprietary technology

### 6. Backup using Acronis True Image (optional)

Given the time invested to produce a true world selection of mixed data files, it is suggested to save it for use in repeated tests. Additional hard disks can be restored with this collection and performance compared against this simple baseline.

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 Important Note: The test procedures call for “Aging” files on this hard disk to simulate the conditions observed in real world file storage systems. As the file aging procedures are relative to the system clock at the time of the test, any future tests using this disk image must ensure the system clock is set to the same day and time that the data on this hard disk was created. The alternative is to repeat the file aging steps in future tests. If this practice is not followed, analyzation dynamics will not produce accurate results.

### Procedural Steps:

1. Install the 15 GB drive. In our tests case this volume was assigned drive letter “L”.
2. Fill drive with data and age the data as outlined above.
3. Create an additional new directory off the root called “HotFiles” and copy several files. The sample test case used 132 random files found on a laptop. All of the files were dated the same date the test was performed and named Hotfile-*nnn*.EXE using **Sophisticated Rename**. Any other extension could be used as well. Thirty two fairly large files were introduced ranging from 15 MB

to 76 MB. These were renamed with the extension “.tst”. These were destined to be the files that would be tested for read access.



4. Diskeeper Corporation Diskeeper version 10.0.594 product was installed on the main computer “C” drive.
5. A screen shot was taken of the prepared drive. (see **Appendix A**, Figure 1)
6. Normal defragmentation<sup>iv</sup> was run on the drive to clean up conventional defragmentation. The next screen shot (Figure 2) in the appendix shows a compacted and fragment-free drive.
7. I-FAAST was enabled on drive “L”, but scheduled to run later. This is to allow the next two steps, which create the “high usage” files, to be completed before I-FAAST runs.
8. The ReadFile test utility is a highly sophisticated test tool that can be configured to run in many environments with many test arguments. Please see the website <http://www.winimage.com/readfile.htm> for complete documentation on how to exercise a full range of tests. The author also provides source code for those wishing to further explore the utility. All of the reads using file open/read requests are executed with caching turned off. This is a setting in the ReadFile test utility. This allows true read times from the disk to be measured and eliminates caching caused by the ReadFile testing utility itself.
9. ReadFile Readfvs8.exe test utility was launched from the HotFiles directory with the command line [Readfvs8 \*.tst >C:\Pre\_I-FAAST\_1.txt]. This caused the output of the test to be written to a data file on a different drive than the one being tested. If this precaution is not taken the file read data will be inconsistent as the test data writes will interfere with the reads causing delays. The above [Readfvs8 \*.tst >C:\ Pre\_I-FAAST\_#.txt] command was repeated 3 more times incrementing the “#” each time.
10. An I-FAAST defragmentation job was forced on the volume by creating a schedule for the current time (i.e. immediately). New Screen shots were taken of the files placement after the I-FAAST job terminated. (see **Appendix A**, Figure 3)
11. Readfile Readfvs8.exe test utility was launched from the HotFiles directory with the command line [Readfvs8 \*.tst >C:\Post\_I-FAAST\_1.txt]. The above [Readfvs8 \*.tst >C:\ Post\_I-FAAST\_1#.txt] command was repeated 3 more times incrementing the “#” each time.
12. The detailed results for the before and after I-FAAST tests can be found in **APPENDIX B**.

**Engineering Note:** Each test run should be examined to make sure no background task (service) launched while the test was being executed. Given natural background system activity, it was found in sample testing that approximately of 20% of the test runs were skewed, so from 10 test runs, the top 2 skewed runs were thrown out and the data from the other 8 were averaged. To ensure accurate results it is recommended that anomalies be removed.

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<sup>iv</sup> Normal defragmentation refers to any defragmentation algorithm not including I-FAAST.

## SUMMARY

-  Access Speed (milliseconds): The cumulative file read time for the most accessed files before I-FAAST defrag was run on the test drive was **70,615 msec** vs. **56,527 msec** (70 seconds vs. 56 seconds) after I-FAAST. This equals a 14+ second gain, or approximately 20% improvement.
-  Throughput (KB/second): The data Diskeeper intelligently determined to be vital on this volume (totaling 1,192,598 KB) was read at an average throughput rate of 17294 KB/sec after normal defragmentation. After the application of I-FAAST, average throughput on that same data increased to 21603 KB/sec, equaling 1.25 times greater throughput.

These tests conclusively show that Diskeeper 10.0's revolutionary I-FAAST technology introduces dramatic enhancements to file access acceleration. These advancements are vital for peak performance in mission critical environments, multimedia workstations and even common production desktops and laptops.

With I-FAAST, Diskeeper 10.0 customers benefit with enhanced system performance by decreasing the latency bottleneck imposed by the disk subsystem on overall system performance. In conjunction with other Diskeeper technologies, this new functionality increases the realized value of automatic defragmentation; systemically lessening total cost of system ownership (TCO). The use of Diskeeper 10.0's advanced technology is clearly an essential component to maintain performance of computer systems running Microsoft Windows.

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# Appendix A

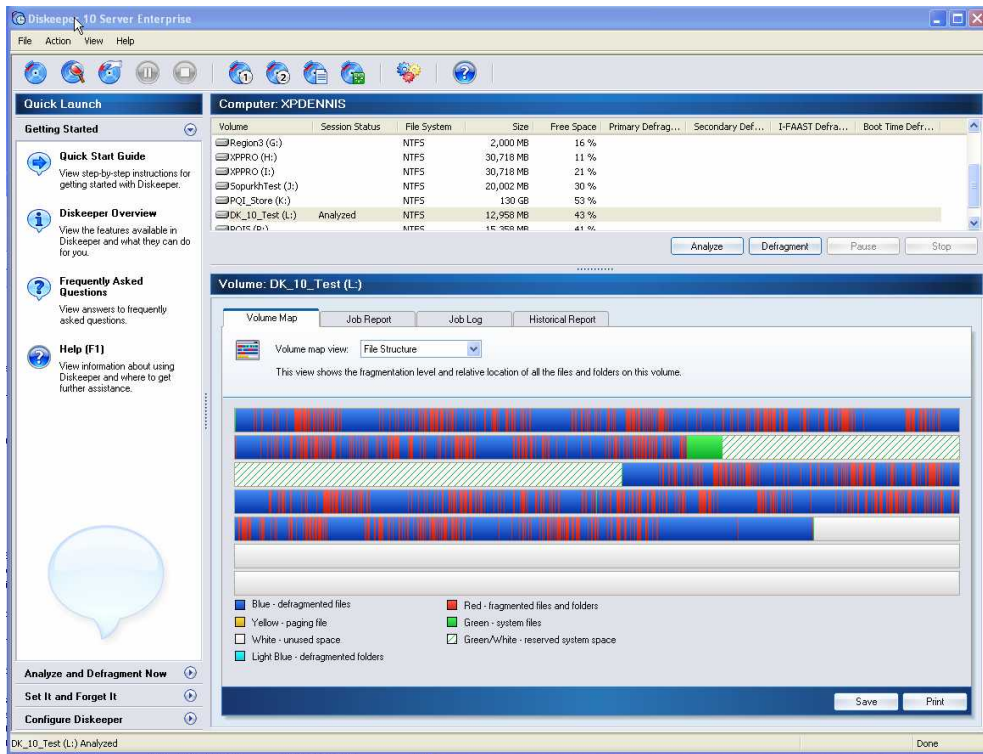


Figure 1

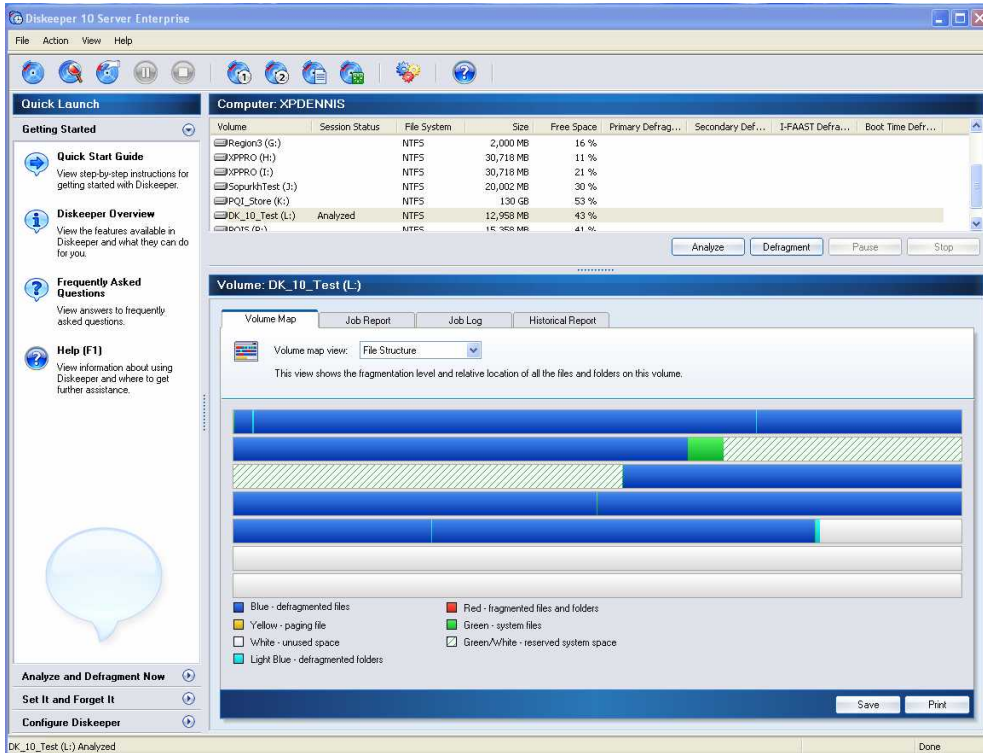


Figure 2

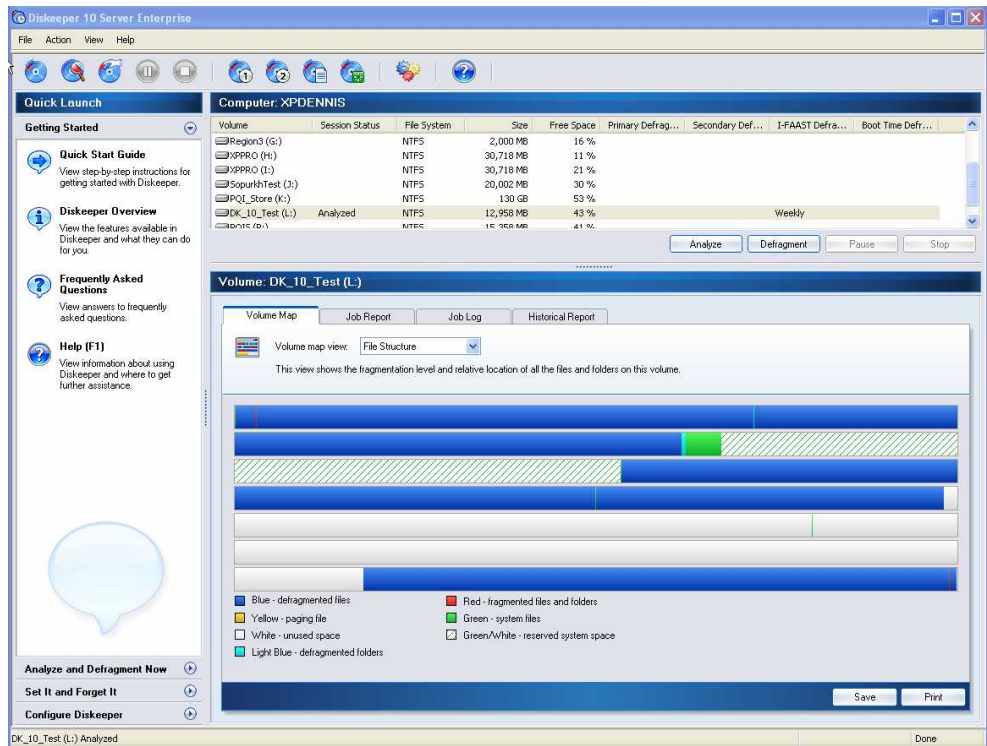


Figure 3



## Appendix B

### **File Access times before I-FAAST (volume was defragmented)**

#### ReadFile 1.50 - <http://www.winimage.com/readfile.htm>

File= 18463 KB/sec with 25645280 bytes : Hotfile-007.tst  
File= 16977 KB/sec with 50000003 bytes : Hotfile-012.tst  
File= 17876 KB/sec with 50000003 bytes : Hotfile-013.tst  
File= 16874 KB/sec with 50000003 bytes : Hotfile-014.tst  
File= 17434 KB/sec with 16144182 bytes : Hotfile-020.tst  
File= 17462 KB/sec with 76326566 bytes : Hotfile-027.tst  
File= 17747 KB/sec with 25645280 bytes : Hotfile-045.tst  
File= 17876 KB/sec with 50000003 bytes : Hotfile-049.tst  
File= 17531 KB/sec with 50000003 bytes : Hotfile-050.tst  
File= 17876 KB/sec with 50000003 bytes : Hotfile-051.tst  
File= 17802 KB/sec with 20454533 bytes : Hotfile-053.tst  
File= 17779 KB/sec with 16144182 bytes : Hotfile-057.tst  
File= 17542 KB/sec with 12034258 bytes : Hotfile-060.tst  
File= 17917 KB/sec with 76326566 bytes : Hotfile-064.tst  
File= 17747 KB/sec with 25645280 bytes : Hotfile-088.tst  
File= 17984 KB/sec with 25645280 bytes : Hotfile-089.tst  
File= 17088 KB/sec with 50000003 bytes : Hotfile-094.tst  
File= 17307 KB/sec with 50000003 bytes : Hotfile-095.tst  
File= 17307 KB/sec with 50000003 bytes : Hotfile-096.tst  
File= 16988 KB/sec with 20454533 bytes : Hotfile-098.tst  
File= 16764 KB/sec with 16144182 bytes : Hotfile-102.tst  
File= 16644 KB/sec with 12034258 bytes : Hotfile-105.tst  
File= 17245 KB/sec with 76326566 bytes : Hotfile-109.tst  
File= 17085 KB/sec with 25645280 bytes : Hotfile-124.tst  
File= 17307 KB/sec with 50000003 bytes : Hotfile-128.tst  
File= 17307 KB/sec with 50000003 bytes : Hotfile-129.tst  
File= 17088 KB/sec with 50000003 bytes : Hotfile-130.tst  
File= 16988 KB/sec with 20454533 bytes : Hotfile-132.tst  
File= 17083 KB/sec with 16144182 bytes : Hotfile-136.tst  
File= 17094 KB/sec with 12034258 bytes : Hotfile-139.tst  
File= 17315 KB/sec with 76326566 bytes : Hotfile-143.tst  
File= 17085 KB/sec with 25645280 bytes : Hotfile-158.tst  
Average = 17335 KB/sec with 1221221081 bytes (total : 70444 msec)

#### ReadFile 1.50 - <http://www.winimage.com/readfile.htm>

File= 18463 KB/sec with 25645280 bytes : Hotfile-007.tst  
File= 16977 KB/sec with 50000003 bytes : Hotfile-012.tst  
File= 17876 KB/sec with 50000003 bytes : Hotfile-013.tst  
File= 16977 KB/sec with 50000003 bytes : Hotfile-014.tst  
File= 17434 KB/sec with 16144182 bytes : Hotfile-020.tst  
File= 17841 KB/sec with 76326566 bytes : Hotfile-027.tst  
File= 17747 KB/sec with 25645280 bytes : Hotfile-045.tst  
File= 17876 KB/sec with 50000003 bytes : Hotfile-049.tst  
File= 17876 KB/sec with 50000003 bytes : Hotfile-050.tst  
File= 17876 KB/sec with 50000003 bytes : Hotfile-051.tst  
File= 17802 KB/sec with 20454533 bytes : Hotfile-053.tst  
File= 17779 KB/sec with 16144182 bytes : Hotfile-057.tst  
File= 17542 KB/sec with 12034258 bytes : Hotfile-060.tst  
File= 17917 KB/sec with 76326566 bytes : Hotfile-064.tst  
File= 17747 KB/sec with 25645280 bytes : Hotfile-088.tst  
File= 17984 KB/sec with 25645280 bytes : Hotfile-089.tst  
File= 17088 KB/sec with 50000003 bytes : Hotfile-094.tst  
File= 17307 KB/sec with 50000003 bytes : Hotfile-095.tst  
File= 17307 KB/sec with 50000003 bytes : Hotfile-096.tst

File= 16988 KB/sec with 20454533 bytes : Hotfile-098.tst  
File= 16764 KB/sec with 16144182 bytes : Hotfile-102.tst  
File= 17094 KB/sec with 12034258 bytes : Hotfile-105.tst  
File= 17315 KB/sec with 76326566 bytes : Hotfile-109.tst  
File= 17085 KB/sec with 25645280 bytes : Hotfile-124.tst  
File= 17307 KB/sec with 50000003 bytes : Hotfile-128.tst  
File= 17307 KB/sec with 50000003 bytes : Hotfile-129.tst  
File= 17307 KB/sec with 50000003 bytes : Hotfile-130.tst  
File= 16988 KB/sec with 20454533 bytes : Hotfile-132.tst  
File= 17083 KB/sec with 16144182 bytes : Hotfile-136.tst  
File= 17094 KB/sec with 12034258 bytes : Hotfile-139.tst  
File= 17315 KB/sec with 76326566 bytes : Hotfile-143.tst  
File= 17085 KB/sec with 25645280 bytes : Hotfile-158.tst  
Average = 17395 KB/sec with 1221221081 bytes (total : 70203 msec)

ReadFile 1.50 - <http://www.winimage.com/readfile.htm>

File= 18705 KB/sec with 25645280 bytes : Hotfile-007.tst  
File= 16977 KB/sec with 50000003 bytes : Hotfile-012.tst  
File= 17531 KB/sec with 50000003 bytes : Hotfile-013.tst  
File= 16977 KB/sec with 50000003 bytes : Hotfile-014.tst  
File= 17434 KB/sec with 16144182 bytes : Hotfile-020.tst  
File= 17917 KB/sec with 76326566 bytes : Hotfile-027.tst  
File= 17529 KB/sec with 25645280 bytes : Hotfile-045.tst  
File= 17876 KB/sec with 50000003 bytes : Hotfile-049.tst  
File= 16561 KB/sec with 50000003 bytes : Hotfile-050.tst  
File= 12856 KB/sec with 50000003 bytes : Hotfile-051.tst  
File= 17802 KB/sec with 20454533 bytes : Hotfile-053.tst  
File= 17779 KB/sec with 16144182 bytes : Hotfile-057.tst  
File= 17542 KB/sec with 12034258 bytes : Hotfile-060.tst  
File= 17841 KB/sec with 76326566 bytes : Hotfile-064.tst  
File= 17747 KB/sec with 25645280 bytes : Hotfile-088.tst  
File= 17984 KB/sec with 25645280 bytes : Hotfile-089.tst  
File= 17088 KB/sec with 50000003 bytes : Hotfile-094.tst  
File= 17307 KB/sec with 50000003 bytes : Hotfile-095.tst  
File= 17307 KB/sec with 50000003 bytes : Hotfile-096.tst  
File= 16988 KB/sec with 20454533 bytes : Hotfile-098.tst  
File= 16764 KB/sec with 16144182 bytes : Hotfile-102.tst  
File= 17094 KB/sec with 12034258 bytes : Hotfile-105.tst  
File= 17315 KB/sec with 76326566 bytes : Hotfile-109.tst  
File= 17085 KB/sec with 25645280 bytes : Hotfile-124.tst  
File= 17307 KB/sec with 50000003 bytes : Hotfile-128.tst  
File= 17193 KB/sec with 50000003 bytes : Hotfile-129.tst  
File= 17307 KB/sec with 50000003 bytes : Hotfile-130.tst  
File= 16988 KB/sec with 20454533 bytes : Hotfile-132.tst  
File= 17083 KB/sec with 16144182 bytes : Hotfile-136.tst  
File= 17094 KB/sec with 12034258 bytes : Hotfile-139.tst  
File= 17315 KB/sec with 76326566 bytes : Hotfile-143.tst  
File= 17085 KB/sec with 25645280 bytes : Hotfile-158.tst  
Average = 17057 KB/sec with 1221221081 bytes (total : 71592 msec)

ReadFile 1.50 - <http://www.winimage.com/readfile.htm>

File= 18213 KB/sec with 25645280 bytes : Hotfile-007.tst  
File= 16977 KB/sec with 50000003 bytes : Hotfile-012.tst  
File= 17876 KB/sec with 50000003 bytes : Hotfile-013.tst  
File= 16977 KB/sec with 50000003 bytes : Hotfile-014.tst  
File= 17434 KB/sec with 16144182 bytes : Hotfile-020.tst  
File= 17841 KB/sec with 76326566 bytes : Hotfile-027.tst  
File= 17529 KB/sec with 25645280 bytes : Hotfile-045.tst  
File= 17876 KB/sec with 50000003 bytes : Hotfile-049.tst

File= 17876 KB/sec with 50000003 bytes : Hotfile-050.tst  
File= 17876 KB/sec with 50000003 bytes : Hotfile-051.tst  
File= 17802 KB/sec with 20454533 bytes : Hotfile-053.tst  
File= 17779 KB/sec with 16144182 bytes : Hotfile-057.tst  
File= 17542 KB/sec with 12034258 bytes : Hotfile-060.tst  
File= 17917 KB/sec with 76326566 bytes : Hotfile-064.tst  
File= 17747 KB/sec with 25645280 bytes : Hotfile-088.tst  
File= 17984 KB/sec with 25645280 bytes : Hotfile-089.tst  
File= 17088 KB/sec with 50000003 bytes : Hotfile-094.tst  
File= 17307 KB/sec with 50000003 bytes : Hotfile-095.tst  
File= 17307 KB/sec with 50000003 bytes : Hotfile-096.tst  
File= 16988 KB/sec with 20454533 bytes : Hotfile-098.tst  
File= 16764 KB/sec with 16144182 bytes : Hotfile-102.tst  
File= 17094 KB/sec with 12034258 bytes : Hotfile-105.tst  
File= 17315 KB/sec with 76326566 bytes : Hotfile-109.tst  
File= 17085 KB/sec with 25645280 bytes : Hotfile-124.tst  
File= 17307 KB/sec with 50000003 bytes : Hotfile-128.tst  
File= 17307 KB/sec with 50000003 bytes : Hotfile-129.tst  
File= 17307 KB/sec with 50000003 bytes : Hotfile-130.tst  
File= 16988 KB/sec with 20454533 bytes : Hotfile-132.tst  
File= 17083 KB/sec with 16144182 bytes : Hotfile-136.tst  
File= 17094 KB/sec with 12034258 bytes : Hotfile-139.tst  
File= 17315 KB/sec with 76326566 bytes : Hotfile-143.tst  
File= 17085 KB/sec with 25645280 bytes : Hotfile-158.tst  
Average = 17390 KB/sec with 1221221081 bytes (total : 70222 msec)

**Overall Before I-FAAST Average 70,615 msec**

### **File Access times after I-FAAST**

ReadFile 1.50 - <http://www.winimage.com/readfile.htm>

File= 21300 KB/sec with 25645280 bytes : Hotfile-007.tst  
File= 22311 KB/sec with 50000003 bytes : Hotfile-012.tst  
File= 22123 KB/sec with 50000003 bytes : Hotfile-013.tst  
File= 21088 KB/sec with 50000003 bytes : Hotfile-014.tst  
File= 21787 KB/sec with 16144182 bytes : Hotfile-020.tst  
File= 22396 KB/sec with 76326566 bytes : Hotfile-027.tst  
File= 20665 KB/sec with 25645280 bytes : Hotfile-045.tst  
File= 21949 KB/sec with 50000003 bytes : Hotfile-049.tst  
File= 22311 KB/sec with 50000003 bytes : Hotfile-050.tst  
File= 22311 KB/sec with 50000003 bytes : Hotfile-051.tst  
File= 22089 KB/sec with 20454533 bytes : Hotfile-053.tst  
File= 21242 KB/sec with 16144182 bytes : Hotfile-057.tst  
File= 20293 KB/sec with 12034258 bytes : Hotfile-060.tst  
File= 22155 KB/sec with 76326566 bytes : Hotfile-064.tst  
File= 20969 KB/sec with 25645280 bytes : Hotfile-088.tst  
File= 21975 KB/sec with 25645280 bytes : Hotfile-089.tst  
File= 22311 KB/sec with 50000003 bytes : Hotfile-094.tst  
File= 21598 KB/sec with 50000003 bytes : Hotfile-095.tst  
File= 21767 KB/sec with 50000003 bytes : Hotfile-096.tst  
File= 20829 KB/sec with 20454533 bytes : Hotfile-098.tst  
File= 21242 KB/sec with 16144182 bytes : Hotfile-102.tst  
File= 20293 KB/sec with 12034258 bytes : Hotfile-105.tst  
File= 21131 KB/sec with 76326566 bytes : Hotfile-109.tst  
File= 22319 KB/sec with 25645280 bytes : Hotfile-124.tst  
File= 21422 KB/sec with 50000003 bytes : Hotfile-128.tst  
File= 21258 KB/sec with 50000003 bytes : Hotfile-129.tst  
File= 21088 KB/sec with 50000003 bytes : Hotfile-130.tst

File= 22089 KB/sec with 20454533 bytes : Hotfile-132.tst  
File= 20750 KB/sec with 16144182 bytes : Hotfile-136.tst  
File= 21644 KB/sec with 12034258 bytes : Hotfile-139.tst  
File= 22396 KB/sec with 76326566 bytes : Hotfile-143.tst  
File= 22319 KB/sec with 25645280 bytes : Hotfile-158.tst  
Average = 21628 KB/sec with 1221221081 bytes (total : 56462 msec)

ReadFile 1.50 - <http://www.winimage.com/readfile.htm>

File= 21300 KB/sec with 25645280 bytes : Hotfile-007.tst  
File= 22311 KB/sec with 50000003 bytes : Hotfile-012.tst  
File= 22123 KB/sec with 50000003 bytes : Hotfile-013.tst  
File= 21088 KB/sec with 50000003 bytes : Hotfile-014.tst  
File= 21787 KB/sec with 16144182 bytes : Hotfile-020.tst  
File= 22396 KB/sec with 76326566 bytes : Hotfile-027.tst  
File= 20665 KB/sec with 25645280 bytes : Hotfile-045.tst  
File= 21949 KB/sec with 50000003 bytes : Hotfile-049.tst  
File= 22311 KB/sec with 50000003 bytes : Hotfile-050.tst  
File= 22311 KB/sec with 50000003 bytes : Hotfile-051.tst  
File= 22089 KB/sec with 20454533 bytes : Hotfile-053.tst  
File= 21242 KB/sec with 16144182 bytes : Hotfile-057.tst  
File= 20293 KB/sec with 12034258 bytes : Hotfile-060.tst  
File= 22155 KB/sec with 76326566 bytes : Hotfile-064.tst  
File= 20969 KB/sec with 25645280 bytes : Hotfile-088.tst  
File= 21975 KB/sec with 25645280 bytes : Hotfile-089.tst  
File= 22311 KB/sec with 50000003 bytes : Hotfile-094.tst  
File= 21598 KB/sec with 50000003 bytes : Hotfile-095.tst  
File= 21767 KB/sec with 50000003 bytes : Hotfile-096.tst  
File= 20829 KB/sec with 20454533 bytes : Hotfile-098.tst  
File= 21242 KB/sec with 16144182 bytes : Hotfile-102.tst  
File= 20293 KB/sec with 12034258 bytes : Hotfile-105.tst  
File= 21131 KB/sec with 76326566 bytes : Hotfile-109.tst  
File= 22319 KB/sec with 25645280 bytes : Hotfile-124.tst  
File= 21422 KB/sec with 50000003 bytes : Hotfile-128.tst  
File= 21258 KB/sec with 50000003 bytes : Hotfile-129.tst  
File= 21088 KB/sec with 50000003 bytes : Hotfile-130.tst  
File= 22089 KB/sec with 20454533 bytes : Hotfile-132.tst  
File= 20750 KB/sec with 16144182 bytes : Hotfile-136.tst  
File= 21644 KB/sec with 12034258 bytes : Hotfile-139.tst  
File= 22396 KB/sec with 76326566 bytes : Hotfile-143.tst  
File= 22319 KB/sec with 25645280 bytes : Hotfile-158.tst  
Average = 21635 KB/sec with 1221221081 bytes (total : 56444 msec)

ReadFile 1.50 - <http://www.winimage.com/readfile.htm>

File= 21300 KB/sec with 25645280 bytes : Hotfile-007.tst  
File= 22311 KB/sec with 50000003 bytes : Hotfile-012.tst  
File= 22123 KB/sec with 50000003 bytes : Hotfile-013.tst  
File= 21088 KB/sec with 50000003 bytes : Hotfile-014.tst  
File= 21787 KB/sec with 16144182 bytes : Hotfile-020.tst  
File= 22396 KB/sec with 76326566 bytes : Hotfile-027.tst  
File= 20665 KB/sec with 25645280 bytes : Hotfile-045.tst  
File= 22123 KB/sec with 50000003 bytes : Hotfile-049.tst  
File= 22311 KB/sec with 50000003 bytes : Hotfile-050.tst  
File= 22311 KB/sec with 50000003 bytes : Hotfile-051.tst  
File= 22089 KB/sec with 20454533 bytes : Hotfile-053.tst  
File= 21242 KB/sec with 16144182 bytes : Hotfile-057.tst  
File= 20293 KB/sec with 12034258 bytes : Hotfile-060.tst  
File= 22155 KB/sec with 76326566 bytes : Hotfile-064.tst  
File= 20969 KB/sec with 25645280 bytes : Hotfile-088.tst  
File= 21975 KB/sec with 25645280 bytes : Hotfile-089.tst  
File= 22311 KB/sec with 50000003 bytes : Hotfile-094.tst

File= 21598 KB/sec with 50000003 bytes : Hotfile-095.tst  
File= 21767 KB/sec with 50000003 bytes : Hotfile-096.tst  
File= 20829 KB/sec with 20454533 bytes : Hotfile-098.tst  
File= 21242 KB/sec with 16144182 bytes : Hotfile-102.tst  
File= 20293 KB/sec with 12034258 bytes : Hotfile-105.tst  
File= 21131 KB/sec with 76326566 bytes : Hotfile-109.tst  
File= 22319 KB/sec with 25645280 bytes : Hotfile-124.tst  
File= 21422 KB/sec with 50000003 bytes : Hotfile-128.tst  
File= 21258 KB/sec with 50000003 bytes : Hotfile-129.tst  
File= 21088 KB/sec with 50000003 bytes : Hotfile-130.tst  
File= 22089 KB/sec with 20454533 bytes : Hotfile-132.tst  
File= 20750 KB/sec with 16144182 bytes : Hotfile-136.tst  
File= 21644 KB/sec with 12034258 bytes : Hotfile-139.tst  
File= 22396 KB/sec with 76326566 bytes : Hotfile-143.tst  
File= 22319 KB/sec with 25645280 bytes : Hotfile-158.tst  
Average = 21642 KB/sec with 1221221081 bytes (total : 56425 msec)

ReadFile 1.50 - <http://www.winimage.com/readfile.htm>

File= 21300 KB/sec with 25645280 bytes : Hotfile-007.tst  
File= 22311 KB/sec with 50000003 bytes : Hotfile-012.tst  
File= 22123 KB/sec with 50000003 bytes : Hotfile-013.tst  
File= 21088 KB/sec with 50000003 bytes : Hotfile-014.tst  
File= 21787 KB/sec with 16144182 bytes : Hotfile-020.tst  
File= 22396 KB/sec with 76326566 bytes : Hotfile-027.tst  
File= 20665 KB/sec with 25645280 bytes : Hotfile-045.tst  
File= 20929 KB/sec with 50000003 bytes : Hotfile-049.tst  
File= 22123 KB/sec with 50000003 bytes : Hotfile-050.tst  
File= 21258 KB/sec with 50000003 bytes : Hotfile-051.tst  
File= 20434 KB/sec with 20454533 bytes : Hotfile-053.tst  
File= 21242 KB/sec with 16144182 bytes : Hotfile-057.tst  
File= 20293 KB/sec with 12034258 bytes : Hotfile-060.tst  
File= 22155 KB/sec with 76326566 bytes : Hotfile-064.tst  
File= 20969 KB/sec with 25645280 bytes : Hotfile-088.tst  
File= 21975 KB/sec with 25645280 bytes : Hotfile-089.tst  
File= 22311 KB/sec with 50000003 bytes : Hotfile-094.tst  
File= 21598 KB/sec with 50000003 bytes : Hotfile-095.tst  
File= 21767 KB/sec with 50000003 bytes : Hotfile-096.tst  
File= 20829 KB/sec with 20454533 bytes : Hotfile-098.tst  
File= 21242 KB/sec with 16144182 bytes : Hotfile-102.tst  
File= 20293 KB/sec with 12034258 bytes : Hotfile-105.tst  
File= 21131 KB/sec with 76326566 bytes : Hotfile-109.tst  
File= 22319 KB/sec with 25645280 bytes : Hotfile-124.tst  
File= 21422 KB/sec with 50000003 bytes : Hotfile-128.tst  
File= 21258 KB/sec with 50000003 bytes : Hotfile-129.tst  
File= 21088 KB/sec with 50000003 bytes : Hotfile-130.tst  
File= 22089 KB/sec with 20454533 bytes : Hotfile-132.tst  
File= 20750 KB/sec with 16144182 bytes : Hotfile-136.tst  
File= 21644 KB/sec with 12034258 bytes : Hotfile-139.tst  
File= 22396 KB/sec with 76326566 bytes : Hotfile-143.tst  
File= 22319 KB/sec with 25645280 bytes : Hotfile-158.tst  
Average = 21508 KB/sec with 1221221081 bytes (total : 56777 msec)

**Overall After I-FAAST Average: 56,527 msec**