Diskeeper Green Back Up

Written by

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Overview

System back-up is a perennial problem today, with hard discs becoming increasingly larger and more affordable to the public. One of the biggest headaches encountered is to successfully back-up a volume shadow of the system that contains huge amounts of data, systems files and an operating system. A heavily fragmented workstation system not only draws huge amounts of energy but also wastes considerable time during such a task.

Within this paper we look closely at the actual cost/performance ratios of the Workstations, and how effective Diskeeper is in maintaining file optimisation whilst completing backup. Furthermore, the actual energy consumption used in both tests is crucial in demonstrating how Diskeeper effectively delivers savings whilst performing tasks of this magnitude.

The simplistic scenario that was set up was of a general workstation heavily used on a day to day basis. The software installed and used is to be found in most studios and offices. The parameters observed in this paper include: Performance, Cost and Time to complete the Task, Wattage consumed for each Test and the overall KWH consumption of each sector from each Test System during the back-up scenario.

One Test System was used heavily for 24 Days without being defragmented then an attempt to back up the full system was generated. The secondary test system underwent exactly the same protocols with the inclusion of Diskeeper after the Windows installation with InvisiTasking and I-FAAST fully enabled. This was to demonstrate how much influence Diskeeper has in saving time and in reducing vital KWH consumption during the back-up procedure.

Both systems were then fully backed up while a simple plug-in mains power and energy monitor was put in place to track down power consumption.

From all the factors laid out above it is clearly demonstrated that Diskeeper does save time, while protecting the disc and maintaining its fully optimised functionality.

White Paper Contents

Methodology & System Configuration

The test system configurations were constructed as listed below:

Intel Test Platform

1 X Akasa Zen Chassis
1 X Akasa Power80+ 500W Power Supply Unit
1 X Akasa 965 Heatsink Fan
1 X Intel Q9300 (2.5GHz) Quad Core CPU
1 X Intel X38 Bonetrail Mainboard
4 X 1GB Crucial DDR3 Ballistix PC3-12800, Memory Modules
1 X AMD FireGL V3600 (Current Driver Release 8.453.1)
1 X Plextor SATA DVDRW+ PX-760A (Designated Drive E)
1 X Akasa 120mm Intake Fan
1 X Akasa 120mm Exhaust Fan
1 X Western Digital Caviar® GP 500GB IntelliPower Hard Disk, SATA 3 GB/s, 8MB Cache.
Boot Disc Designated Drive C
1 X Western Digital Caviar® GP 1TB IntelliPower Hard Disk, SATA 3 GB/s, 16MB Cache.
Data Disc Designated Drive D

Intel very kindly supplied the Q9300 Quad Core CPU and X38 Bonetrail mainboard to match. The mainboard has an abundance of energy efficient & recyclable parts built into place

Akasa, supplying the important chassis, PWM Heat Sink Fans, Intake and Exhaust fans, most importantly of all the Power Supply. The 80-plus is qualified by EPRI solutions (USA) and meets EPS and Blue Angel conservation standards.

Hard Discs, once more we chose the new Green Powered drives from Western Digital which we have found to date live fully up to the stated claims of saving energy but maintaining optimal productivity output.

Graphic card of choice – the FireGL V3600 came from ATI. An entry level professional workstation graphics card that combines excellent performance with minimal costing and all-importantly draws less than 80 watts of power, which in turn means we can implement the low wattage, energy-efficient power supply – while providing the end users a very high degree of productivity output.

This left the memory supplied by crucial memory whose parts are fast and efficient, while complying with current RoHS Standards. Although these high end parts of memory may seem as if they would consume huge amounts of energy, they are extremely efficient.

Software Used.

Maintaining the like for like, we utilised the exact same software packages found within systems in Corporate Workplace, Studios and the SoHo users.

Microsoft Windows XP Professional SP3 with complete updates and Driver Installations
SPECviewperf 10 ®
Autodesk 3ds Max 9 SP2
SPECapc for 3ds Max™ 9
Solidworks 2007 (complete Installation)
SPECapc for SolidWorks 2007™
HD Tach Version 3.0.4.0
FutureMark 2006 Advanced
PCMark 2005 Advanced
SiSoftware Sandra XII SP2
MAXON CINEBENCH 10
Diskeeper® 2008 Pro Premier Edition (Latest Build)
3DS Max Working File of Yosemite Park (3.93GB uncompressed)
Microsoft Office Professional 2003 SP3 (Complete Installation)
Microsoft Outlook PST file of 1.86GB was transferred and installed
Microsoft Intellipoint & Keyboard Software
AVG Internet Security Version 8 (Complete Installation) running fully
Adobe CS3
Adobe Acrobat 8 Professional

General procedures:

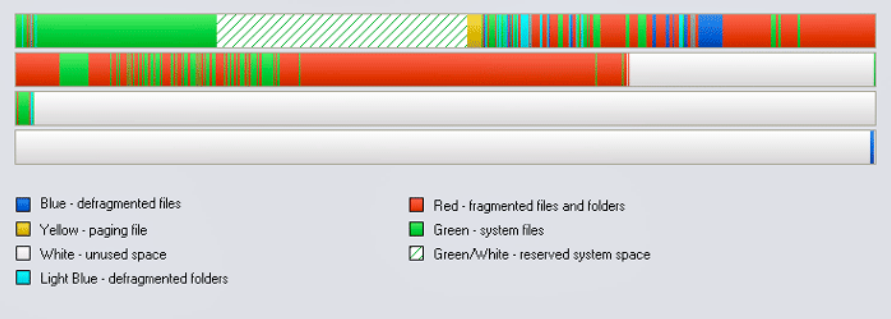
1. Before installation of Microsoft Windows XP Professional, the hard disks were low-level formatted (to eradicate any trace of the Master Boot Record and File Tables embedded on the hard disks).
2. Microsoft Windows XP Professional SP3 had a full update of all current operating system fixes and security patches. The system drivers and Microsoft .Net 3.5 & .NET 2.01 fixes were applied as they are essential requirements for the testing applications and ATI Catalyst Control drivers.
3. Programme files have been installed to their default locations.
4. The full installation of all software, professional applications, benchmarks and files used within these tests totalled 167GB's (Test System 1 without Diskeeper) & 158/159GB's (Test System 2 with Diskeeper) for Test Systems. The application of the synthetic and professional benchmarks were run to fully stretch the system I/O and put in place a set of test figures for later evaluation. However the primary function of these tests is to verify first and foremost that the test systems had been fully soak-tested and ensured to the highest functionality.
5. In order to provide unequivocal and accurate results, each set of tests has been carried out in the order shown above. This process ensures that the SPECviewperf® 10 & SPECapc™ fair-play rules are properly adhered to, while simultaneously allowing a constant build of application software which, in turn, allows the hard disk to build up a natural state of fragmentation.
6. Results obtained. The results obtained are taken from the **first run** of each test after programmes installation. This ensures the complete accuracy of the test.

With the scenarios now set as above, we concentrated upon having the systems run continuously over a 24 day period to achieve as much fragmentation as physically possible in Test System 1. Within Test System 2 Diskeeper was installed with InvisiTasking and I-FAAST fully enabled, after the baseline professional benchmarks had been completed and therefore not interfering with the result runs as laid down in the fair play rules.

At day 24 we then commenced to deploy Windows Shadow Back-Up of the system volume from each Workstation to see how long each system would take to complete the task and how much energy would be consumed by each system throughout the Back-Up tests. The results within the next X pages astounded all.

Drive C Test System 1 – Hard Disc Capacity of 167GB with No Diskeeper Installed

Analysis. Time started at 1001 and finished at 1043 – Peak Wattage 107 Watts. Noted average throughout the analysis run was 98 Watts. KHW used to complete the test was 0.07KWH. Time to complete the full analysis of Drive C was 42 Minutes.

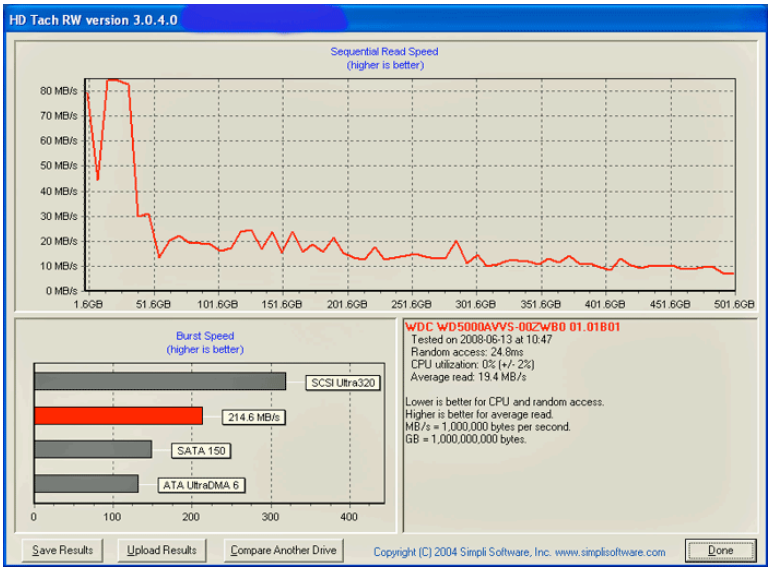


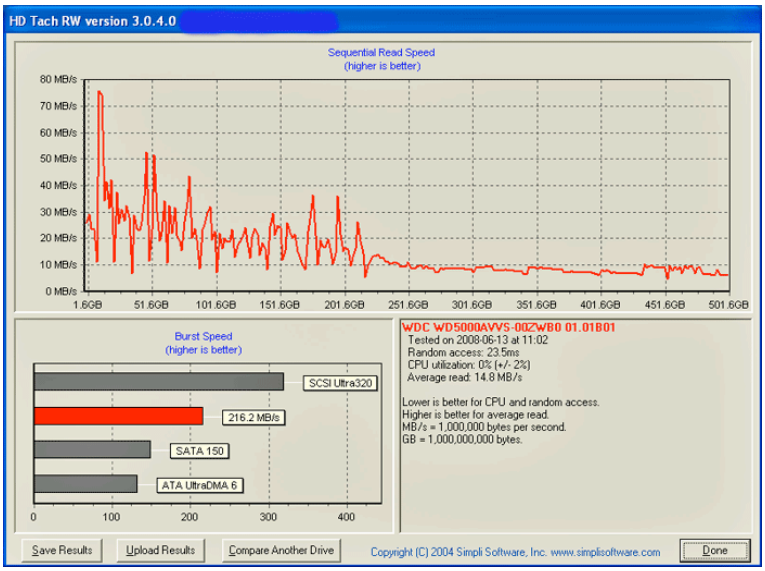
Job Report - Volume Drive C (C :):

Recommendations

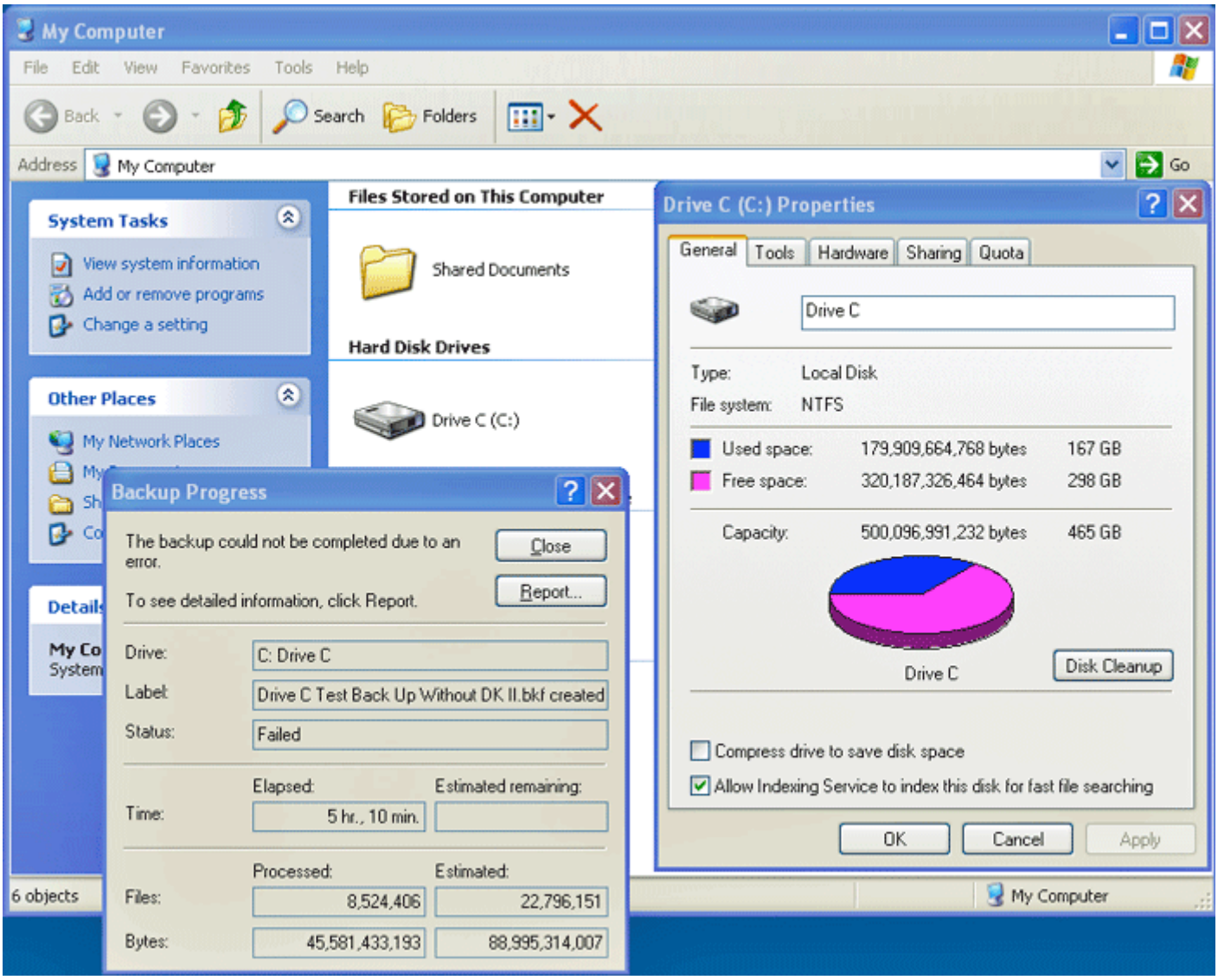
Findings on C: Diskeeper has completed analysis of this volume and found 142,008 fragmented files and/or directories and 1,957,490 excess fragments. The average number of fragments per file is 1.08.

HD Tach Tests (Short and Long) show Drive C Status Prior to Back Up on Test System 1





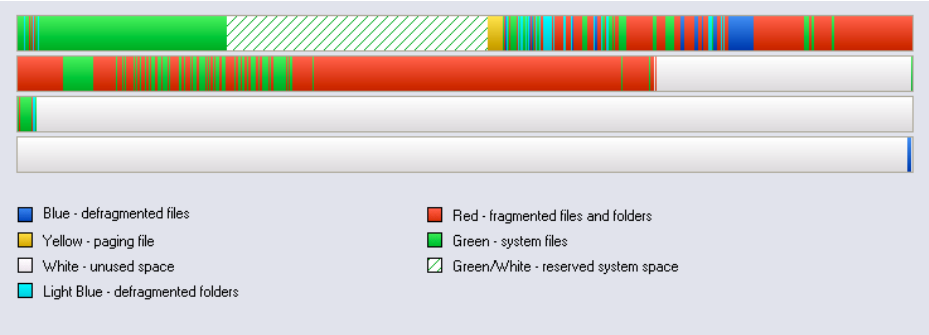
Shadow Volume Back Up of Drive C – Failed Due to Fragmentation at approx 40%. Time started at 1115 and finished at 1735 – Peak Wattage 114 Watts. The observed noted average throughout the fragmentation run was 104 Watts. KHW used throughout the test was 0.65KWH. Time to complete until failure of the Shadow Volume Back-Up was 6 Hours and 10 Minutes. This evolution was attempted a further 5 more times and failures happened at approximately 40 – 50% during the Shadow Volume Back-Up. Test System 1 Logs show Back-Up failures due to excessive Hard Disc Fragmentation.



Drive C Test System 2 – Hard Disc Capacity of 158GB with Diskeeper Installed

For this test Diskeeper was deployed ran once to fragment the file system then fully disabled for the Shadow Volume Back-Up. We therefore finalised with this sector of the tests the following findings.

Analysis. Time started at 1330 and finished at 1337 – Peak Wattage 94 Watts. KWH's used throughout the test was 0.01KWH's. Time to complete 7 Minutes.



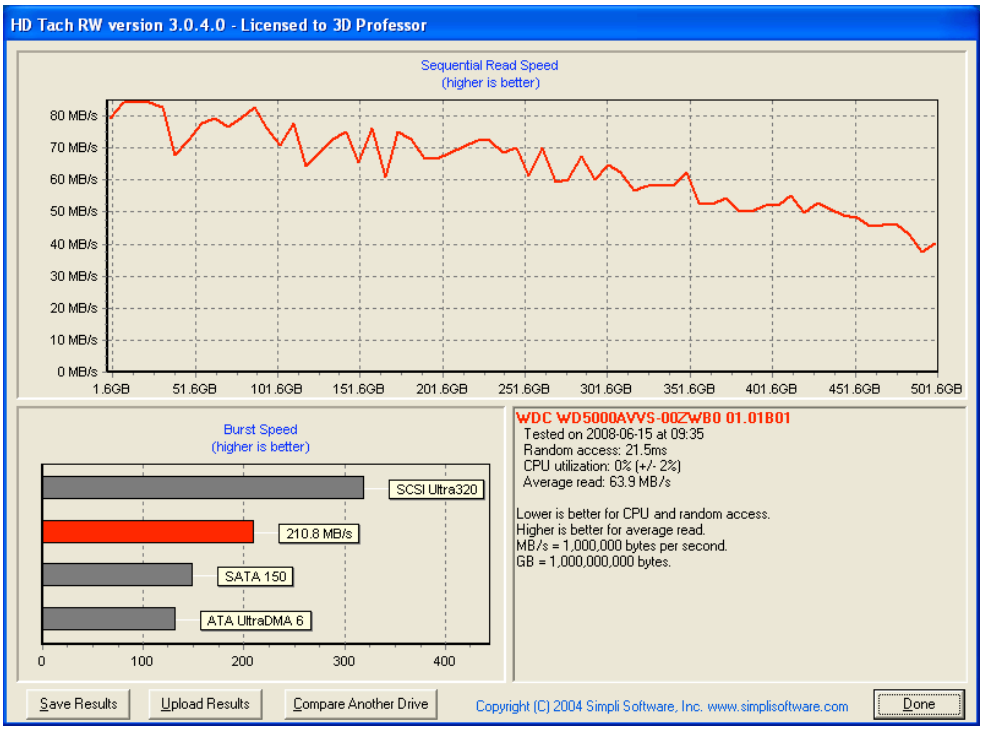
Job Report Volume Drive C (C:):

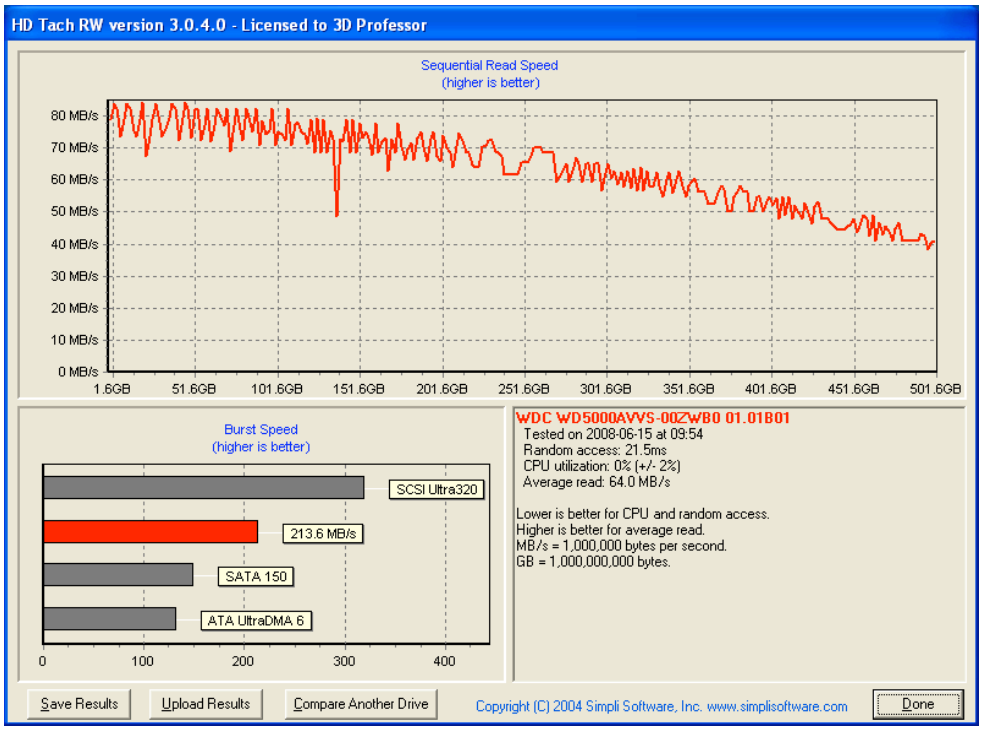
Recommendations

Findings on C: Diskeeper has completed analysis of this volume and found 142,008 fragmented files and/or directories and 1,957,490 excess fragments; the average number of fragments per file is 1.08.

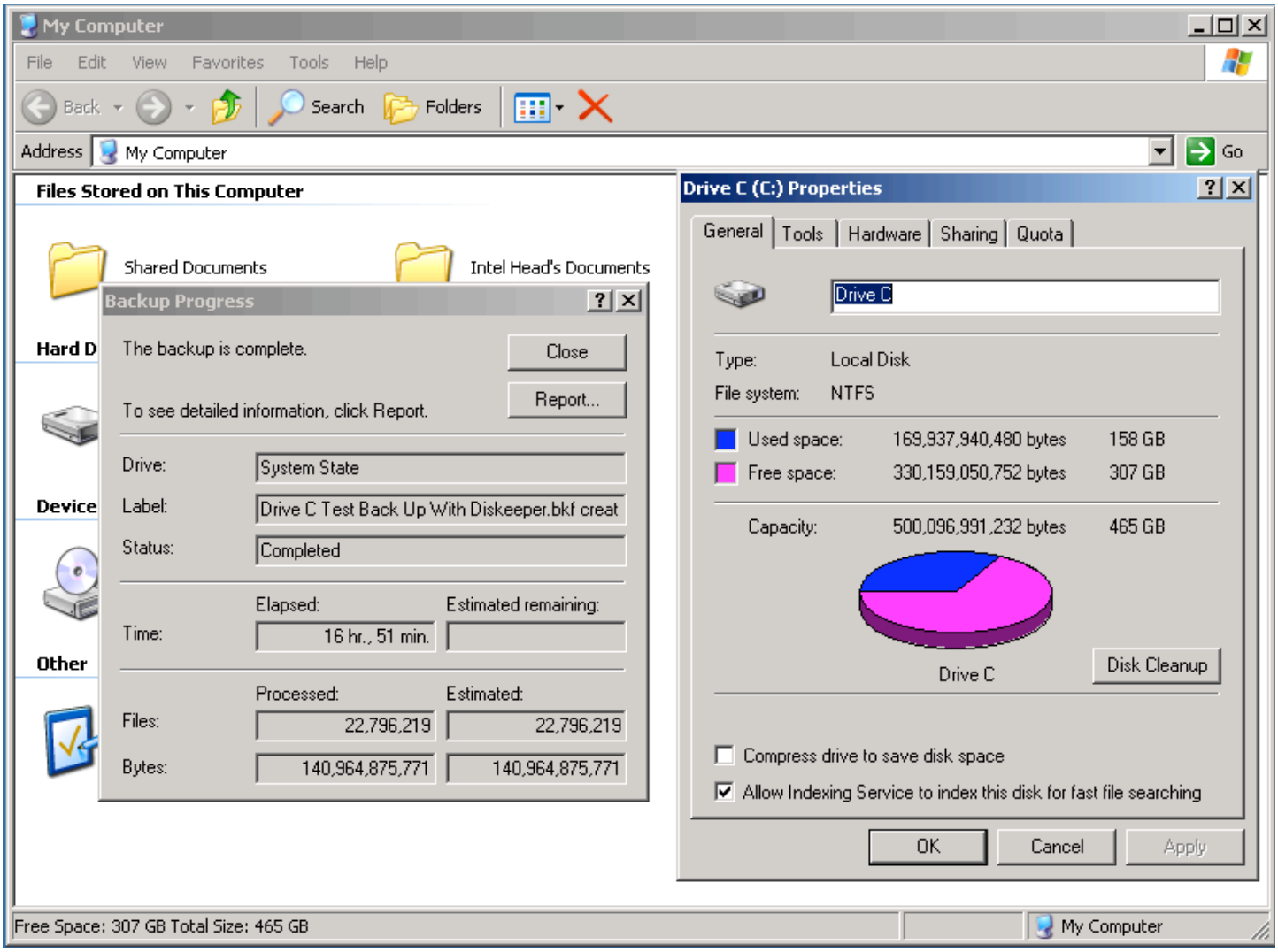
Defragmentation of Drive C. Time started at 13:42PM and finished at 22:27PM – Peak Wattage 96 Watts. Noted average throughout the fragmentation run was 90 Watts. KHW used throughout the test was 0.77KWH's. Time to complete defragmentation of Drive C was 8 hours and 37 Minutes.

HD Tach Tests (Short and Long) show Drive C Status Prior to Back Up on Test System 2



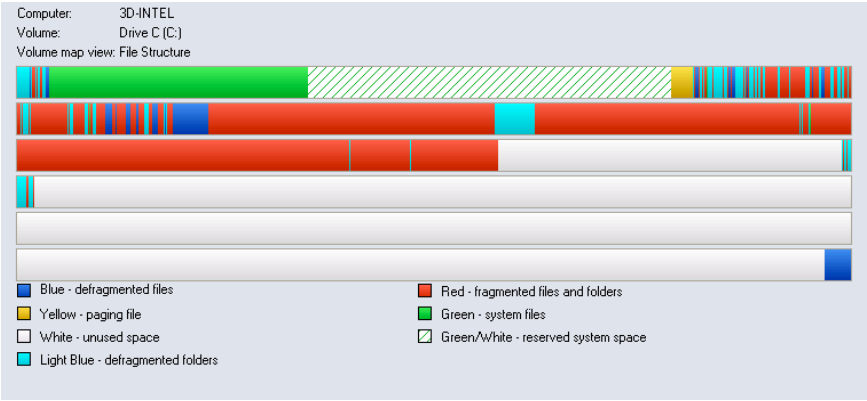


Shadow Volume Back Up of Drive C. Time started at 06:20AM and finished at 00:04AM – Peak Wattage 103Watts. Noted average throughout the Back-Up was to be observed at 100 Watts. KHW of energy to complete the Back-Up equalled 1.64WH. Time to complete a full System Volume Back-Up was 16 Hours and 44 Minutes.



Drive C Test System 2 – Hard Disc Capacity of 159GB Diskeeper Installed and Fully Enabled with Invisitasking & I-FAAST Technology

Analysis. Time started at 07:15AM and finished at 07:19AM – Peak Wattage 92 Watts. KWH's used throughout the test was 0.01KWH's. Time to complete 4 Minutes.



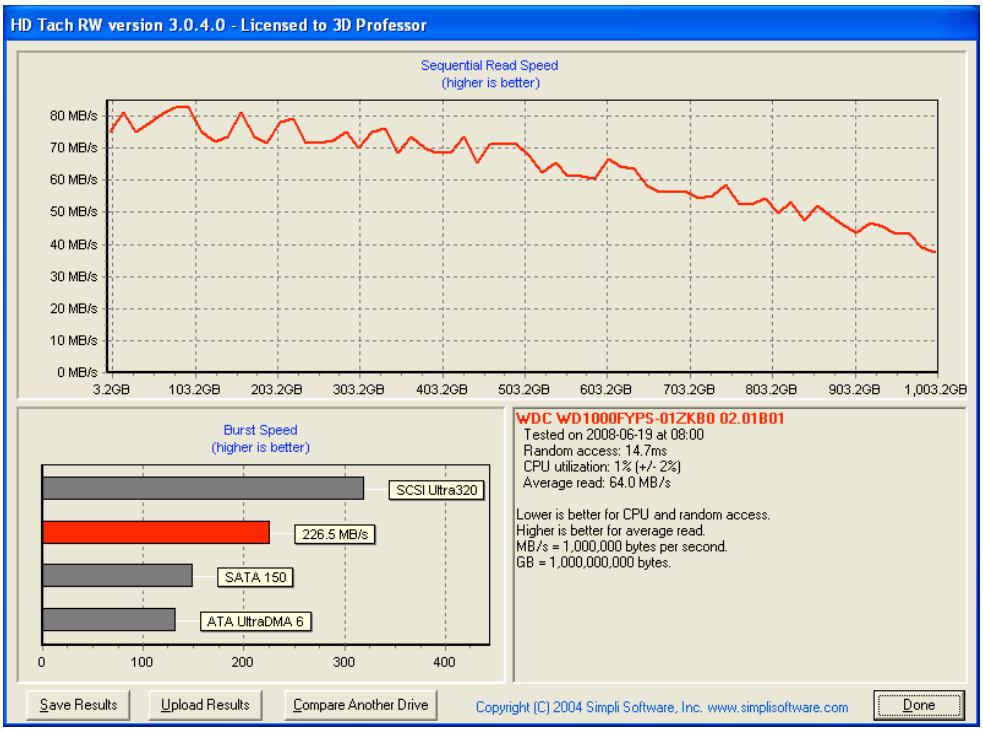
Job Report Volume Drive C (C:):

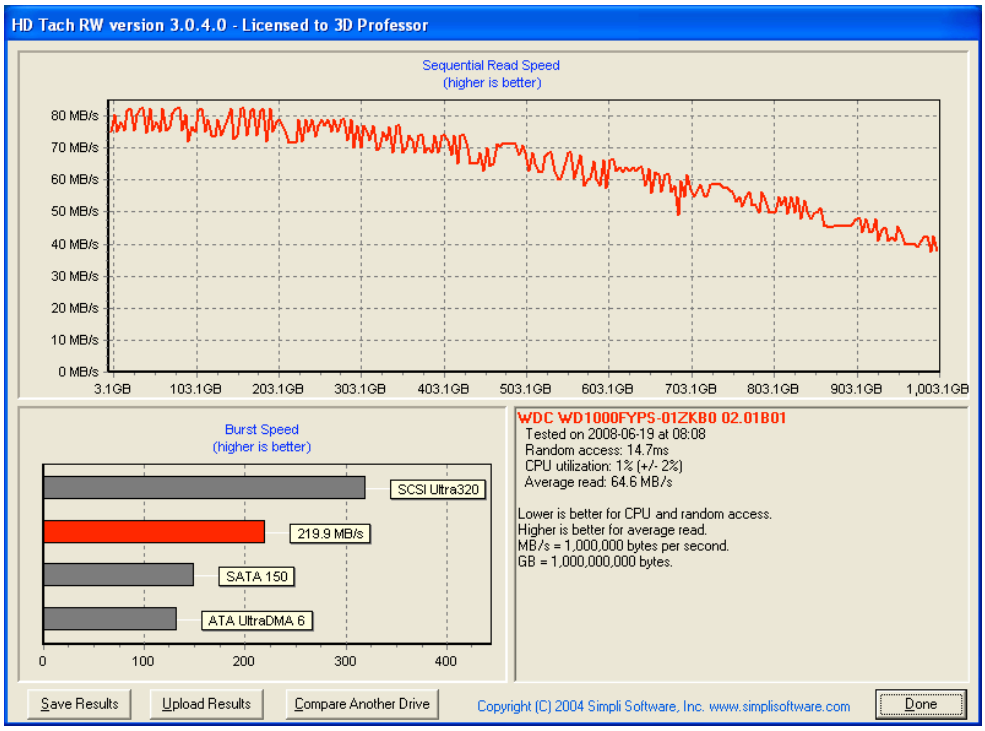
Recommendations

Diskeeper has completed analysis of this volume and found 142,241 fragmented files and/or directories and 1,956,530 excess fragments. The average number of fragments per file is 1.08.

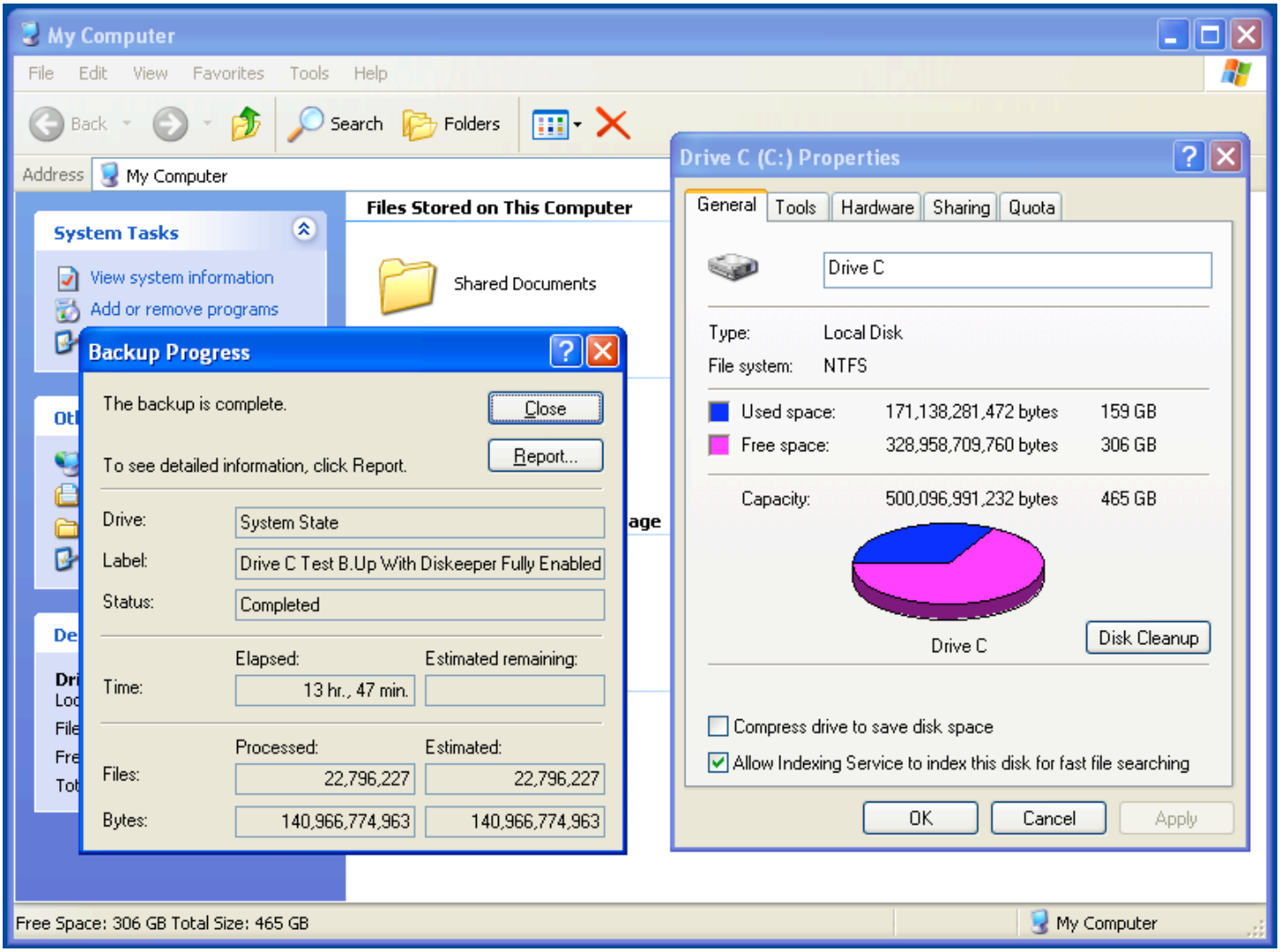
Defragmentation of Drive C. Time started at 07:20AM and finished at 07:34AM – Peak Wattage 94 Watts. Noted average throughout the fragmentation run was 87 Watts. KHW used throughout the test was 0.02KWH's. Time to complete defragmentation of Drive C was 14 Minutes.

HD Tach Tests (Short and Long) show Drive C Status Prior to Back Up on Test System 2





Shadow Volume Back Up of Drive C. Time started at 07:40AM and finished at 20:27PM – Peak Wattage 101 Watts. Noted average throughout the Back-Up was to be observed at initially 88 Watts rising to 98 Watts at 50% of the Back-Up completed. KHW of energy to complete the Back-Up equalled 1.38WH. Time to complete a full System Volume Back-Up was 13 Hours and 47 Minutes.



Conclusions

The scenario shown overleaf has unequivocally demonstrated the benefits of implementing Diskeeper from the very onset of installation of Microsoft Windows and all required applications and software. Although the hard disc capacity was somewhat larger than normally found – though not too far off a normal workstation capacity of a normal user - the end point was to successfully prove that Back-Up of this magnitude does require to be managed in such a clinical manner.

Fragmentation was very high indeed due to the very nature of the workstation's day to day multitasking operations. When Back-Up on the fragmented disc was attempted on several occasions it failed primarily due to the extreme fragmentation that the workstation had produced. The clear demonstration of failure at 40 – 46% produced wastage on average of 6 system hours and 0.65KWH of energy. No company can claim that they can afford to have this tremendous outage time in a system or loss in precious KWH's of power.

With the installation of Diskeeper from outset we see the system maintaining a high level of disc hygiene and optimal performance at all times. As shown previously within Page 6, a heavily fragmented disc was only producing speeds of 16 – 20Mb/s. That is less then a third of the drive's actual optimal performance of 64Mb/s (as shown within Pages 8 – 11) when Diskeeper was fully installed and running on the secondary test system. At this level file of fragmentation, drive failure would be common - and extremely catastrophic in all areas of workstations which produce sensitive case data.

Many know just how time-consuming and frustrating a task this can be to repair, especially when backing up many systems simultaneously. This proved to be the case with 6 complete Back-Up failures, wasting 33 hours of Test System uptime and 3.9KWH's of energy. This scenario is all too common and cannot be ignored; no company or individual can afford to be this flippant in losing time or energy, as demonstrated within this paper.

The simple tests shown here demonstrate the effectiveness of Diskeeper with InvisiTasking and I-FAAST technology at its best. Analysis taking 42 Minutes to complete on Test System 1 without Diskeeper vs. the 7 minutes on Test System 2 with Diskeeper. The answers are abundantly and exceptionally clear here. The Test Systems Index file systems had grown to an expected level. However the implementation of Diskeeper with its I-FAAST technology saw Back-Up time dramatically reduced, most importantly without any Back-Up failures, and an impressive further saving of energy. I-FAAST Shadow Back-Up reduced the time by a clear 3 Hours and 4 Minutes, saving 0.26KWH's of energy.

Penultimately, with all that has been demonstrated within this paper it unequivocally shows how much beneficial impact Diskeeper had within Test System 2. Failures in back-up are all too common and no company can afford this luxury today as the cost of power is reaching all-time heights. For the simple cost of the Diskeeper software package which deliveries such efficiency and persistently saves money, the answers are now clearly defined.

At the beginning of the paper it was stated that time, energy and productivity could be saved by the simple implementation of Diskeeper; this has been proven unequivocally.

Diskeeper Green

Produced by Professor Brian Robinson – Sponsored by Diskeeper Corporation

The Paper "Diskeeper Green" was produced by Professor Brian Robinson and sponsored by Diskeeper Corporation