Fragmentation: the "solution" that became a problem for an entire industry.

Years ago computer systems could only write files in a non-fragmented manner. If the media to which the file was written did not have enough contiguous space to write the file, you were out of luck and you lost data. The only solutions to address this drawback required taking that computer system offline. Then along came a brilliant invention—Fragmentation. The ability to fragment a file when writing it was initially a blessing. That invention, which seemed great at first, soon uncovered a new dilemma.

Fragmentation is a problem

Imagine shredding a hard copy document into confetti. It will fit into a smaller space, but try reading that document fast! In a similar fashion, an operating system breaks files into pieces to better utilize disk space. Ideally, a contiguous file would require a single access to retrieve, but in a fragmented state, the read and write heads have to access the disk many more times, taking much longer and working much harder. Due to the way space is allocated for file placement, fragmentation breeds more fragmentation, even if the disk has 90% free space to expand into!

Fragmentation couldn't happen to a more vulnerable part of the system. The hard drive is at least 100,000 times slower than RAM and over 2 million times slower than the CPU. Add fragmentation and you have a serious bottleneck. More RAM and a larger CPU won't make it go away.

Death and taxes…and fragmentation too

You probably take measures to avoid life-threatening risks and most likely are fairly honest paying your taxes. Ignoring those can incur great penalties. Like Death and Taxes, fragmentation is inevitable as well. You can't ignore fragmentation, at least not without major penalties. Left unhandled, workstations and servers will degrade in terms of speed, reliability and productive longevity. They'll steadily decline, eventually taking down the networks that link them together. Many server crashes, end user Help Desk calls and network problems seem to be caused by a multitude of factors and tie up an enormous amount of sys admin time. They are in fact *caused solely by excessive file fragmentation.*

Good-enough isn't enough—the end of the break-fix era

Because fragmentation is an algorithm in the operating system, defragmentation has developed into an afterthought mentality. Break it, then fix it later when you have time. This gave rise to two methods of defragmentation: last-resort panicked *manual* defrags and later intrusive and complicating *fixed schedule* defrag. Neither method has much effectiveness or relevance in today's network. Manual defrag requires hands-on operation and system resource priority or it can't hope to get the job done. Fixed schedule defrag is a work-around for system resource conflicts and requires schedule management and off-hours operation.

Both methods have a critical flaw: they do not defragment when the system needs it the most: during times of high traffic and peak production. Today's big bandwidth, data dense high-speed traffic, virtualized environments,

peripherals, Web 2.0 streams and power computer requirements put an enormous demand on I/O volume and speed and thus increase the rate of fragmentation exponentially.

Technology has advanced enough that things can be done right the first time. The best way to handle fragmentation is to not let it happen in the first place. Diskeeper Corporation eliminates fragmentation almost as soon as it is created and it does it with zero system resource conflicts. Now data can be accessed and written at maximum speed—far beyond even out-of-the-box specifications—and the slows, hangs, freezes and crashes excessive fragmentation causes vanish along with the time and money it costs to handle.

Fragmentation key points

1. Fragmentation is an intentionally designed feature of Windows® operating systems intended to solve the problem of fitting files onto hard disk spaces efficiently.
2. Fragmentation is actually a problem, not a solution. All computers suffer from it.
3. As fragmentation accumulates it progressively slows file access speed, creating reliability issues and greatly reducing system productivity.
4. Fragmentation directly affects the slowest component in a computer's throughput, the hard drive, creating an enormous performance bottleneck.
5. Defragmentation methods traditionally suffered from the "break it, then fix it" afterthought mentality. This allows fragmentation to run wild during peak production times.
6. With the sharp rise in throughput demand and extended network hours, defragmentation technology demanded the innovation of a true "real-time" defragmenter that did not conflict with active system resources.
7. Diskeeper® 2009 with InvisiTasking® technology is the only solution that eliminates fragmentation almost as fast as it is created, using only idle system resources.

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