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Raxco Software White Paper

Enterprise Disk Defragmentation: A Proactive Approach to Reducing Costs and Improving Productivity

The simple truth is that disk fragmentation can cost as much in lost productivity as spam, yet too few organizations are addressing the issue.

Cost-conscious organizations examine each aspect of their business to identify productivity improvements that will yield a competitive edge. One such aspect is defragmentation of servers and workstations.

Computerworld magazine recently published the results of a Nucleus Research survey conducted to assess the impact of spam on organizations. This survey showed that users on average were spending 6.5 minutes per day dealing with spam at an annual cost of $874 per user. Of course, everyone understands what is happening when users are wasting their time managing spam, and are shocked at its costs. The simple truth is that disk fragmentation can cost as much in lost productivity as spam, yet too few organizations are addressing the issue.

The IT mantra the past few years has been that storage and its management is the key to the success of the enterprise. All manner of new technologies are arising to help manage storage better and to improve the backup and recovery of the enormous amounts of data now online. Disk defragmentation is one of the easy, inexpensive, and proactive steps that can be taken by IT managers, yet it is often overlooked or dismissed as a "low priority."

The size of server and desktop disk drives continues to grow at an amazing rate. Most user activity is disk-intensive, not CPU-intensive. The faster processors will not appreciably improve the time it takes to read and write files. The bottleneck in most applications is transferring data to and from the disk. Anything that can accelerate this process improves throughput. Indeed, global IT advisory firm IDC states that "disk defragmentation grows increasingly important as disks grow larger in size and performance requirements increase."

Fragmentation is a normal byproduct of system use under all Windows® environments. It begins immediately and

erodes system performance with time and use. The time needed to read a fragmented file can be 30-80% longer than for the same file when it is contiguous. These savings extrapolated over a user-installed base of hundreds or thousands can equate to hundreds of thousands of man hours wasted waiting for files to open. The cost of this unproductive time is enormous.

Disk defragmentation prevents system slowdowns, possible application errors and hangs, and in the worst cases, system crashes. Many organizations will experience a decrease in help desk calls and system management expenses by heading off the problems fragmentation causes. Defragmentation can also reduce the ever-tightening windows for running system-wide backups, since defragmented drives can be backed up as much as 50% faster than fragmented drives. Defragmentation of Microsoft Exchange data stores recaptures space from Exchange databases.

Disk defragmentation works by making files logically contiguous. This means a file is contiguous based on the way the file system "sees" it. When a file is created, the file system uses information available to decide where to locate the file. The addresses the file system uses are called Logical Cluster Numbers, or LCN's. If a file is located in more than one LCN address, it is fragmented. To read the file, the file system must identify the starting location of each piece of the file and its corresponding length. This information is reported to the disk controller, which determines where a file physically resides on the disk drive. If a file is in 100 pieces, the file system must report the starting LCN and length for each piece. If a file is contiguous the file, system need only report a single address and length, and that is always faster.

Because all disk defragmentation occurs at the logical level, it works for all kinds of disk storage. Defragmentation works equally well on workstations and servers, IDE, SCSI, all levels of RAID, and stripe sets.

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Microsoft® offers a built-in disk defragmenter with the operating system, but this tool falls far short of what organizations need in terms of enterprise functionality and manageability. The built-in tool offers some unexpected surprises when it comes to what it actually does. Gartner Research, in a report published in February 2003, made this observation and recommendation about the built-in defragmenter:

"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."

Another serious drawback to the built-in defragmenter as an enterprise utility is that it cannot be scheduled or used over the network. To manage defragmentation across the enterprise, a central console for deployment, scheduling, configuration, management and reporting should be available. This dramatically reduces the need for system administrator intervention. The solution should also be able to integrate with Active Directory® Group Policies. Active Directory integration supports the deployment, scheduling, configuration and management of defragmentation.

If your organizations plans do not include Active Directory, look for a defragmenter that supports a peer-to-peer architecture where an administrator can perform network scheduling and management from any workstation or server in the network.

Sometimes the obvious often gets overlooked as a possible solution, especially in the IT field where there are always some really neat new toys available. If a user is having system performance issues, a newer, faster hard drive for $200 is often the solution of choice.

Disk defragmentation software costing $35 would improve the access time by 30-80% and keep it fast. It also intelligently position files on the disk and consolidates the free space so you can make the best use of all your disk space. Help desk call also would be reduced substantially. In both the short and long run, disk defragmentation software represents a better value.

Saving a few seconds on each file being opened on every server and workstation in the enterprise does not sound particularly scintillating, exciting, or even like a major technical breakthrough. Users accessing files on servers are unlikely to even notice. But reducing the time it takes to open a file from six seconds to three seconds is a 50% improvement. Booting a machine 20 seconds faster means you can start to work sooner.

And, if a 500-user organization can save an average of three seconds per file on 100 file opens per day, the organization will save 41.6 person hours in a single day. That is 41.6 hours their users were waiting to open files they could have used doing something else. On an annual basis, that is 10,400 hours spent waiting for files to open at an approximate cost of $260,000 or $520 per user. Now $520 isn't as expensive as the per capita cost of spam, but if you do nothing about enterprise fragmentation and wait another six months, it will be.