



Some do, some don't

Stephen Rodda takes the Executive approach to fragmentation and defragmentation, and tries to quell some concerned response to a schools networking query.

Some file systems fragment; some don't. When I first started using a defragmentation utility it was done in the foreground and took about a minute to run. This, of course, was *COMPACT and it was on the BBC Micro. No wonder it took only one minute. All it had to do was to move less than 200Kb of data on a floppy disk. Nowadays, with very much larger hard disks, the spectre of disk fragmentation and defragmentation

utilities rears its ugly head.

Do I need to defragment? The answer to this question depends very much upon the operating system and how it is used.

Novell maintains that with the random access nature of any file server (since many users are likely to be demanding different data and files at the same time) defragmentation of a NetWare server is not necessary. Of course, we all know what advantages are to be gained by

defragmentation of a DOS FAT or HFS (Macintosh) drive using either the proper utilities or by backing up all files, deleting them and then restoring them. Now the jury appears still to be out under NTFS. Either we look at the network as a whole (in the case of a file server) or we consider just the user who has the computer as a desktop machine. Of course, NTFS becomes fragmented and there is a utility for measuring

this from Executive Software at <http://www.execsoft.com>. I found that it was impossible to contact the Web site and opted for the download from CiX instead.

The company additionally supplies a file defragmentation utility for NTFS, but it appears that this requires constant upgrading between service packs. It has also been alleged that this firm is associated with the Church of Scientology. I downloaded the file and ran it on my NT setup. Look at Fig 1 to see what it found.

I put the results down to the fact that I have restored the system to a clean disk, as I wrote last month, and this together with the fact that most of the data itself resides on the file server, means that my NTFS machine's hard disk doesn't change very much and therefore doesn't get fragmented. I must say that after restoring the whole contents of the hard disk, disk operations seemed to run at breakneck pace, and since the hard disk was exactly the same model this is probably the reason — I'm sure the access time of the hard disk won't have changed.

I still feel, however, that whether a file server is running NetWare or Windows NT, or anything else as a file service platform, the fragmentation is less important than that of a workstation type of machine. The reason is that given by Novell, and what with elevator seeks and so on (where disk requests are sorted into sequential requests depending upon the address of the sector on the hard disk required, so that the heads don't thrash), the impact upon data transfer speeds through fragmentation should not be an issue.

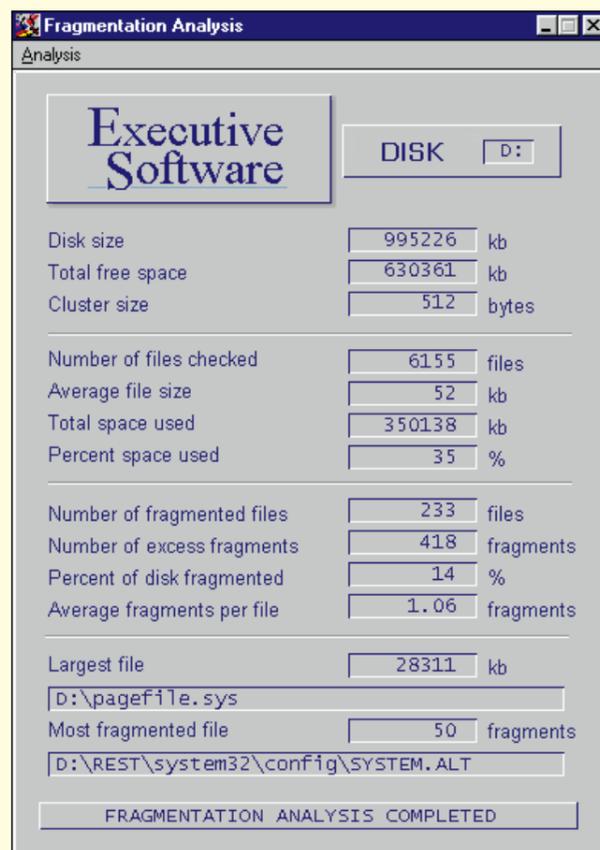


Fig 1 Fragmentation Analysis Utility from Executive Software, showing fragmentation on my NTFS disk

Network platform integration

Doing my usual check on the various versions of software which have come lately to the market, I am still amazed that PageMaker 6, although reasonably true to the format of the document used, still doesn't store PC and Macintosh files in a common format. I like to keep tabs on inter-platform compatibility and of course this is one of the things I wanted to check out. PageMaker 6 must still make a copy of the document when converting between platforms. Fig 3 shows that the open original radio button is greyed out and that the only choice here is to open a copy of the original document.

On the same sort of subject, I notice that NT Server's automatic conversion from Macintosh to PC format and back again has been disabled for Windows 95 clients. When a Macintosh user saved a Microsoft Word file as, say, "Letter to Fred Bloggs and Co 31-5-96" to a Macintosh share on NT Server, a Windows 3.x client would see the document as something like "Letter~1.doc" and Word would be able to open the document quite happily from a double-click on the document. Under Windows 95 as a client, the document's name appears as "Letter to Fred Bloggs and Co 31-5-96", but without the extension, so it's a case of guessing which program created it. The only solution I can currently see is to persuade the Macin-

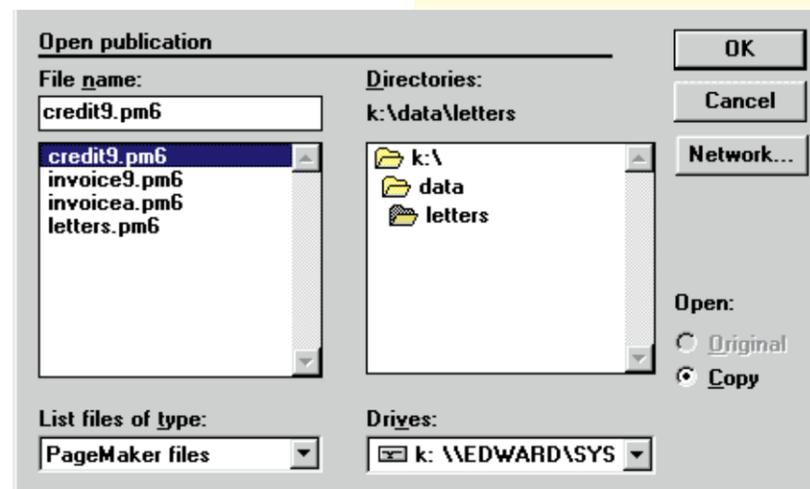


Fig 3 Pagemaker 6's file open dialogue box showing the "Original" radio button greyed out

tosh users (and this isn't easy, considering they've all had total filename freedom) to use the DOS extension convention and to save, say, PageMaker publications as .PM6, XPress documents as .QXD, Word documents as .DOC and so on. I hope Microsoft sorts this thing out in due course.

Pentium, and that a better processor than a P5-75 would be appropriate for the Win NT Server. However, I was not certain whether you were suggesting that Win NT Workstation would run satisfactorily on a 486DX100 equipped with 8Mb of RAM, or whether it should be a P5-75 or better processor.

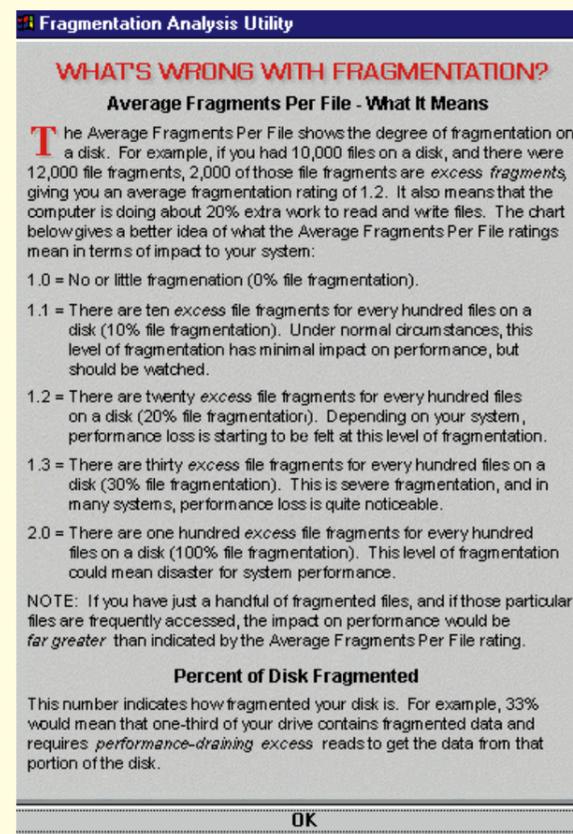
I have always assumed from what I have read that one ought to use a reasonably fast Pentium with Win NT Workstation in order to obtain adequate performance from it; e.g. a P5-90 or better with at least 16Mb, if not 32Mb, the specification increasing according to the applications one intends to run.

By the way, I am examining the best way forward for my own organisation, which will have a full complement of four staff, but using high-end systems in part."

David Priestley

Thank you for your comment. The suggestion that I made for the NT server — that a high-end 486 (such as a 486DX-100) will outperform a lower specified Pentium (such as a P75) — also holds good for the workstations. With the current availability of DX4-120 chips at reasonable prices, I feel that from a performance point of view it would, as you rightly suggest, not be a good idea to use a Pentium running slower than around 90MHz; so, yes, unless you're using code specifically optimised for the Pentium, stick with the 486 until Pentium prices come down — they will, especially with clone chip makers like AMD and Cyrix entering the fray.

We are also looking at educational machines, not at production machines. The reason I suggested NT Workstation is that, in my experience, NT outperforms Windows 95, and that running a single



Other schools of thought about networking

My reply to Stuart Davies in the May issue seems to have stirred up a hornets' nest. Here are some of the letters which I have received: "I read your article addressing Stuart Davies' school networking query in the May PCW with interest. However, I was a little uncertain regarding one aspect of it. I note that a 486DX100-equipped machine can outperform a low-end

Fig 2 This screenshot of the help file for the fragmentation utility explains the analysis in Fig 1

application (or two at a pinch) would not overtax the machine.

Of course, in a working environment, these machines would indeed benefit from more memory, but lessons tend to advance at a more relaxed pace than a working environment and therefore a small speed trade-off, rather than embroiling the school in a full lease contract, would be acceptable.

"After reading your column in May PCW, I think you are the one to ask concerning Windows 95 networking. I have two questions:

1. I have a quad-speed EIDE CD-ROM drive in one of my computers. I can share this drive, and map a network drive to it. But how do I make Windows 95 think that this is a CD-ROM drive and not just a network drive? By tricking Windows 95 into thinking that it is a CD-ROM drive, I can achieve the following:

a) playing audio CDs on a remote computer; and
b) using applications that require MSCDEX, such as most CD-ROM games.

2. When I click on the 'Access Control' tab from Network in the Control Panel, I can see that there is an option for 'User Level Control'. What is this? I can't find any reference to how to set up this facility.

Do I need Windows NT? (All my machines use 'Client for Microsoft Networks' from Windows 95) — I have heard that this will allow me to choose which users can access which shared resources, as opposed to giving a

resource a password."

Paul Oakham
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The first problem is that, as far as I am aware, (1a) is not possible without a remote control package. You could then, using something like Carbon Copy for Windows 95, get the machine to play an audio CD simply by taking control of it from the remote machine. On the other hand, an audio CD should play automatically when inserted, but if you particularly like the CD, I suppose you could get the remote machine to play it again (and again) with a remote control package.

Not being a particular games player (I get enough excitement playing with hardware on my machines), I'm afraid I don't really understand the requirement. Is it that the games software actually requires the MSCDEX in order to fool it that there's a CD loaded before it will run over a network connection? If so, then you'll have to pester the manufacturers. It's more likely that the game hits the MSCDEX extension directly, rather than bothering with niceties such as DOS's own filing system, so you'll probably be in the same boat even if you do manage to load MSCDEX anyway.

The user level control you mention in the networking control panel in section (2) of your letter is available only to Novell NetWare clients, and requires a NetWare server to be installed on the network. This server does all the user validation required. The only ways to achieve this

are either by setting up a NetWare server or by running Windows NT as you suggest.

"I've just read your reply to the perplexed school computer manager in May's PCW. I must say, that while I normally respect your magazine's advice and bow to you as a network expert, I sincerely hope the poor guy doesn't take your advice.

Educational networks are a slightly different breed from your standard business setup and they operate in significantly different ways. Firstly, you have far more users than machines. In my own school there are over a thousand users and a network of 50 machines. You can't expect (as you would in a business) that because Sally is using the computer in that office today, she'll be using the only one using it. The system has to be set up so that PCs are user-independent. In my own school, everyone has their own area on the hard disk and these areas are secure from other users; students can log on to the system at any point in the school and get to their own (password protected) area.

Secondly, in business, security against users is not a huge concern. But in schools, if your system is not completely tamper-proof, some eager beaver will be rooting around in system areas or, even worse, trying deliberately to bring the whole thing down for a laugh. Alternatively, they will use the system to play lots of games and this is not really what it was bought for, was it?

Thirdly, when I describe myself as a

network manager, this is by way of a secondary description: I spend most of my time teaching — this is what the school pays me for. Network management has to take about one or two hours a week at most and therefore I place a high value on the support I get from my supplier. I haven't got time to take apart all my 286s, insert new boards and set up a network all on my own — not if I want to stay sane. Most school network managers feel the same because schools are so pushed for cash these days they can't afford to employ people who spend all their days tinkering with the kit.

Lastly, schools have no capital — they are in effect given running expenses each year. In good times they can save out of these running expenses to finance big purchases but you must have noticed that these are not good times for schools.

Teachers are being made redundant, and experienced teachers are being pushed into early retirement (newly qualified teachers are cheaper) because there is no spare cash. That's why many schools are having to go towards leasing if they want reasonable kit."

Phil Hardcastle

Thank you for your interest. I note your points and would like to defend my suggestions.

The first aspect you mention is "hot-desking", which basically is the industry term for having fewer computers and desks than computer users. The thing with Microsoft Windows 95 and, indeed, with NT is that each user will have their own area on the file server in which to store files — naturally. This is what file servers are all about. Indeed, NT and Windows 95 specifically allow separate desktops to be stored for *each user* so this will allow hot-desking with no problem. Furthermore, NT has even better support: one's desktop will follow one through a whole organisation over any number of NT machines.

Your second point makes differences between the security needed by a business and an educational site. The thing about business is that in some concerns, as you suggest, security may not be an issue but I think you are over-exaggerating a school's need for security as opposed to that of a large organisation. At any one time there must be thousands of confidential documents stored on a large business's file server to which the management would not want just any member of the company to have access. Security is therefore paramount,

and only by having either knowledge of an administrative login and password, or direct and unsupervised access to the file server, could anyone break into the system. This naturally follows for schools as well as for the corporate sector, as does unauthorised access to the system areas.

Apart from some specially-designed front-end to Novell NetWare I can conceive of nothing which would make the administration of a file server as easy as that which is already built in to NT Server. Believe me, file servers are as impregnable to attack as the computer room or their passwords. It's as easy as that; you need no specially-crafted software nor hardware to secure an NT (or, come to that, a NetWare) file server.

Thirdly, server administration is not a wholly automatic process. You have to change backup tapes and so on, and to purge outdated files. At the end of an academic year, you will have to remove the logins and files of those who have left the school or college, and at the beginning of each academic year you will have to generate new accounts for that year's intake. Adding a network card to a machine is a trivial matter in comparison, best carried out during the holidays, perhaps with help from a computer-literate parent or two. The somewhat extreme reference you make to "spend(ing) all their days tinkering with the kit" is, of course, a knee-jerk reaction. Once a network adaptor or motherboard is installed, it stays there. I concede that you can always find people who will willingly fit this model, but now that we have left the pioneering days behind, computers are serious business machines with hardware stability to match and this sort of involvement is neither desirable nor necessary.

My reasoning behind the advice not to lease is that I felt the upgrade to the equipment could be financed out of what would, in effect, have been one year's leasing fees. To this effect, no new money would have needed to have been found — what they were probably prepared to pay in leasing in the first year would almost definitely have provided the upgrades required for that year. Remember that leasing can be the financial equivalent of trying to fill the bath with the plug out. ■

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