Holographic data storage is in the pipeline, and Brian Clegg foresees the end of the magnetic disk.

The future is crystal clear

Home users with a modern PC on their desk have it cushy when it comes to disk space. Okay, you can never have too much storage; but even with the disk-eating capabilities of a modern game, the 5Gb-plus that you'll find in a decent machine will last a while. Businesses have a harder time of it. Not only is the average corporate PC less well specified, there is a whole hierarchy of storage with which to cope. There is the local storage on the PC, storage for the networks and storage for the mainframes – and all of them are feeling the pinch.

Until recently, the only options have been magnetic. Either you kept the information on a hard disk, backed it up to floppy (given infinite time) or used some form of tape. But now, the optical revolution is taking place. The recordable CD-ROM is fairly commonplace. Drives are cheap and the disks themselves are affordable. Yet the capacity, while impressive compared with a diskette, is limited. Thankfully, DVD has arrived – or has it? When DVD was first specified, it seemed a wonderful idea. Unfortunately, bickering among the members of the consortium and the inability to settle on a clear standard has left the whole DVD format in a risky state. Few businesses are yet prepared to go down that route. Should you go with the original read/write standard, DVD-RAM, or the breakaway Sony/Philips offering, DVD+RW? In either case, while DVD will provide a great backup and distribution medium once the squabbling is over, it is no replacement for the hard disk. It is simply not fast enough. Recognising that the ability to cram hard-disk capacity into a small space will run out as the manufacturers reach the limitations of magnetic domains, there is frantic research being carried out to find the next generation of storage. Business waits with baited breath. PC hard disks might be big these days, but serious databases measure their capacity in terrabytes (one million megabytes is one Tb).

The best bet for the future would seem to be holographic storage. In this experimental technology, data is stored on a crystal, using lasers – exactly the same interference-pattern approach as is used for 3D holographic pictures. The technical problems are significant, though. The accuracy of the laser positioning and the sensitivity of the material used to recapture the data correctly is a nightmare. But once these problems are overcome, the data centre managers will be dancing in the street.

A holographic store could reach transfer rates of 100Mbps, because it can pull a huge chunk of data out at one time. The compactness of the storage means that it would be quite feasible to pack 2Tb into the same space as one of today's PC hard disks. Data will not be lost because of moving parts breaking down. In fact, the crystal itself should be able to sustain a fair amount of damage before any data is lost. This Star Trek technology may not be too far away, either. IBM, at the forefront of holographic-storage research, believes it should be commercially viable in less than ten years' time. It's a case of don't hold your breath, but the end may be in sight for our old friend, the magnetic disk.

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● **A while ago, I mentioned a problem** I had experienced with an ISP. Here's another salutary tale. Like most businesses I have my own internet domain, which I use for my email address. But I access the net via an ISP, so my outgoing mail goes through the ISP's server. Recently, for a whole week until I noticed, all my outgoing mail disappeared. The ISP had decided (without bothering to tell anyone) to send any outgoing mail that wasn't from one of their mail addresses into a black hole. When I complained, they pointed me to an alternative server. It seems incredible that a company can take an action that makes mail disappear, without telling anyone. It was claimed that this was for security reasons (which is why I'm not naming names) but anyone who uses a different outgoing mail address ought to be regularly checking that the mail gets through. You never know when you will be next!

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