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More bits, more power
64 bit computing takes PCs to the next generation

Few people would disagree that the IT world is a fast moving one, full of constant change and innovation. Often really big changes may simmer quietly for years in the technical shadows, before bursting forcefully into the mainstream. This year, 2 such technologies are about to take your computing power to the next level.

Back in the mid 80's, Intel introduced the 80386 processor. This was the birth of 32-bit computing. 32-bit processors could handle loads more memory than their 16-bit predecessors, and were capable of doing more things at once.

This was great, and people snapped up the new technology. While network operating systems like Windows NT and UNIX could exploit this technology on servers and high end workstations, users in the mainstream were still running old MS-DOS and trying to trick their software into accessing anything more than 1 Megabyte of memory. It took until 1995 when Microsoft released Windows 95 to unlock this 32-bit potential that was already on most desktops.

32-bit computing vastly increased the amount of memory the computer could access to an unthinkable maximum of 4 Gigabytes (Gb) of RAM. At the time, nobody could conceive that we would ever need more than that. Just as 10 years before that, nobody thought we would ever need more than 640kb!

Today, 4Gb doesn't sound quite so unthinkable. Most new PCs have 1Gb, and new servers with 4Gb are not uncommon. With memory prices so cheap, cost is no longer an obstacle. A single DVD image, for example, could be up to 9Gb, so video editors already have to juggle it around in memory. With the advent of High Definition video, these files will only get bigger.

Enter 64-bit computers. 64-bit technology moves the maximum memory size to a whopping 16 Exabytes. An Exabyte (EB) is a Quintillion Bytes, or a billion Gigabytes. To put it in perspective, in 1999, it was estimated that the sum total of all human knowledge, including video, images, audio and text, amounted to 12 Exabytes.

64-bit computers have actually been around since 1995, when HAL computer systems released the SPARC64. By 2001, Intel, Sun and IBM all had 64 bit processors on the market. But while they gained some footing in big datacentres, they were too expensive to impact the mainstream computer market. Consequently there wasn't a lot in the way of software that would benefit from 64bit. Intels 64 bit Itanium computers could run some 32bit software, but did so slower than a regular Pentium 4, so they were not that attractive to the mass market.

In 2003, AMD introduced their X86-64 technology, whereby their processors could run current 32bit software natively, but extensions allowed them to switch to 64 bit when needed. Intel quickly followed suit with their own clone of this technology, catchily called EM64T.

Now for the good bit. Though you probably didn't know it, many computer manufacturers have been shipping these 64 bit extensions on their high end servers and workstations for nearly a year. Microsoft reckon by the end of 2006, all new servers, and most PCs will be 64bit ready. Current Intel Xeon processors and several members of the Pentium4 family, along with AMDs more sensibly named Opteron64 and Athlon64 are all x64 capable chips. Many of Apples new Macs are also running 64bit chips.

With that in mind, they are preparing 64bit versions of all their popular software. Windows 2003 and Windows XP are already available in 64bit, as is SQL Server 2005. By later this year, Microsoft Office, Exchange Server and lots of others will be available in 64bit.

In fact, so convinced are Microsoft that 64bit will catch on this year, that the next version of their Exchange Server email product, due to ship at the back end of this year, will only be available in 64bit flavour. They say the product runs 75% faster on the same hardware as 64bit code. 32bit versions of other products will still be available, but will be gradually phased out over the next 2 or 3 years.

Once 64bit software and operating systems are commonplace, computers have a new direction to grow in, as 64bit processors get more sophisticated.

So if we have 64bit computers capable of handling loads of memory, high definition video and massive files, our 1 Megabit per second (Mbps) broadband is going to start to look a little creaky. Thankfully, technology is racing along there too.

In April, BT will begin upgrading its exchanges to handle 8Mbps broadband. Most broadband providers will then offer this as their standard speed, and many of us will automatically get upgraded.

With speeds like that commonly available, CD-ROMs could become a thing of the past for distributing software. At 8Mbps, a full CD-ROM would take about 15 minutes to download, and a typical music track would take just a few seconds.

Once high speed connectivity is in place, the door is open to do so much more over the Internet. Sky TV has already begun broadcasting some of its channels over the Internet, and high definition video on demand is just around the corner. Video Conferencing and working from home should become much more feasible.

So all being well, by this time next year, cyberspace could be a very different place.