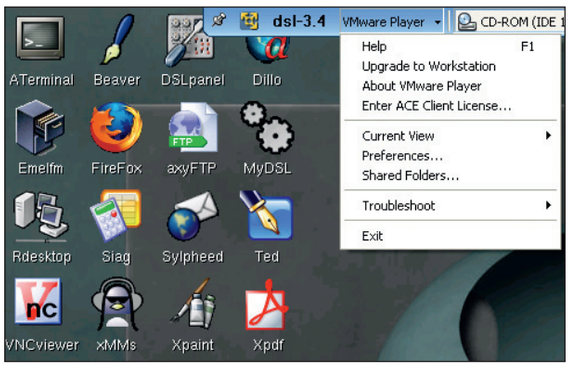
Virtualisation from the ground up

Virtual PCs offer many benefits, from running one OS under another to low-cost multi-user setups

Virtualisation. It's the word on every IT professional's lips; and it's no longer for the big boys only. Whether you're a home user, a small business owner or in education, this up-and-coming technology could have something to offer you. First, though, an explanation. What is virtualisation and why might you want it? Like so many buzzwords, virtualisation can mean many different things, depending on whom you're talking to and what they're trying to sell you. The one common factor is that it's a technology that somehow makes a single PC appear to the user as more than one computer.



▲ **VMware Player: This might look like a Linux PC, but it's actually running under Windows XP.**

Virtual machines

Perhaps the most common form of visualisation is a software utility to generate multiple virtual machines, each of which can run a copy of an operating system (referred to as the guest operating system).

These virtual machines appear to an operating system as real hardware but are, in fact, software emulations of an actual PC. This allows you to use operating systems as diverse as Linux, Unix variants and different versions of Windows on a native Windows machine. If you need to run applications under a variety of operating systems, the cost benefit compared to running multiple PCs is self-evident. There is also a benefit compared to configuring your PC as a multiple-boot system in which you can select the operating system at power-on. With the virtual solution, changing between operating systems can be almost instantaneous – and it's often possible to cut-and-paste or drag files between them. And with some virtualisation packages, applications running under different operating systems in different virtual machines are able to communicate with each other. This could be useful when developing or demonstrating client-server systems on a single PC.

A virtual machine is nothing more than one or two files that define the state of the machine. This opens up lots more benefits, even if you don't have need for more than one operating system. Educational users, for example, might choose to restore all the PCs in the IT suite to a pristine state at the end of each lesson by uploading a virtual machine via the network. This is a much quicker

SoftXpand

Price £59 per user (£50 ex VAT)
Supplier www.miniframeuk.com
Info www.miniframeuk.com
Updated reviews and pricing at www.techradar.com/463964

SoftXpand allows a PC running Windows XP Professional to support up to six users, each of whom need only a monitor, keyboard and mouse. This is achieved by using a dual-head graphics cards (PCI Express recommended) in the host PC and a mini USB hub per user for the keyboards and mice. If you're starting from scratch, the UK distributor can also provide the central PC, which has three PCI Express slots for six users.

Typically, a SoftXpand solution – including the software, host PC, monitors, keyboards and mice – will cost £1,476 to £2,008 for four to six users, compared to about £1,720 to

£2,580 for multiple mid-range PCs. The solution becomes very attractive for just two users if you already have a powerful PC that you can build on. Thinking green, MiniFrame suggests a reduction in electricity consumption from 510W to 120W per hour for six users. For standard office apps, the reduction in response due to competition for resources is barely noticeable. ■

PCPlus Verdict

★★★★½

VMware Player

Price Free download
Supplier www.vmware.com
Info www.vmware.com
Updated reviews and pricing at www.techradar.com/463955

VMware Player is the freely available cousin of commercial app VMware Workstation. The difference between them is similar to that between the full version of Adobe Acrobat and the Acrobat reader; VMware Workstation allows you to create virtual machines whereas Player only lets you use virtual machines that others have made and distributed.

This might seem a major drawback in that you can't, for example, run any versions of Windows or Mac OS as guest operating systems using Player since nobody can legally distribute virtual machines including these

operating systems. However, if you're interested in Linux or Unix variants, there's no shortage of virtual machines. We installed the 48MB DSL (Damned Small Linux) and it worked perfectly. It's also pertinent to point out that we experienced no noticeable degradation in performance – something that might be expected of the virtualisation approach. ■

PCPlus Verdict

★★★½☆

process than using Windows Restore and it also goes further, because apps and files are restored too.

It's also possible to distribute virtual machines. Many of the free operating systems (mainly Linux and Unix variants) are available as virtual machines, and this approach is much simpler and quicker than installing the operating system normally. Some apps are even distributed this way, operating system and all (so long as the operating system is a freely distributable one such as Linux), providing the user with a hassle-free installation guaranteed to work.

And finally there's the issue of security. Each operating system – or copy of the same operating system – is shielded from the host operating system and the hardware. This means that if one virtual machine becomes infected with a virus or some other malware, the other virtual machines and the host remain safe. Similarly, if the operating system running on one virtual machine becomes unstable, perhaps due to inexpert 'tinkering' with Windows or a failed application installation, you can still use the other virtual machines. This method has been used by professionals who use the same PC for business and personal use. Virtualisation means that there's no possibility of a problem with the personal virtual machine from negatively impacting the business virtual machine.

Getting physical

Virtualisation doesn't have to be limited to a single PC. Indeed, some virtualisation solutions allow multiple users to work simultaneously using the resources of a single central server or even a desktop PC.

As before, the virtualisation software on the host machine generates a number of virtual machines. However, rather than swapping between those virtual machines on a single screen using a single keyboard and mouse, each machine is mapped onto different user hardware. Most commonly, each user works with a so-called thin client but has the perception of working with their own PC.

Thin clients can take various forms, but the common factor is that they are cheaper than normal stand-alone PCs. This can produce a considerable cost saving, even for quite modest numbers of users. They are basically very simple PCs that do little more than communicate with the host server via a network connection and provide a user interface comprising screen, keyboard and mouse. As such, they have a less powerful processor than normal PCs, less memory, often no local storage and smaller power supplies. But you don't necessarily have to use dedicated thin client hardware. If you have old, under-powered PCs that would otherwise be discarded, these can be pressed into service as thin clients too.

The cost-saving of adopting a thin client solution may not be huge in terms of the cost of buying the hardware, but to many organisations there is a much greater saving on offer with virtualisation. By having only simple hardware on each desk and having each virtual machine under central control, support costs can be much reduced.

Furthermore, by removing local storage and perhaps even USB ports into which memory sticks can be inserted, the potential for users to install their own software is reduced, if not eliminated. See the 'Enterprise Solutions' box for some sources of this type of product.

A much rarer type of product (such as SoftXpand, reviewed here) takes this concept one stage further by simplifying the user interface to just a monitor, keyboard and mouse. This has most of the advantages of a virtualised system with thin clients but is optimised for smaller numbers of users. In the case of SoftXpand, the number catered for is up to six per host PC, at which break point it's financially very attractive.

Compared to the thin client solution, however, there is an obvious downside. Because the keyboard and mice connect via USB and without special USB repeaters, the software becomes limited to a group of users in close proximity. In fact, since the distance limit for USB is five metres, users must sit within a circle of only a ten-metre diameter. ■

Mike Bedford

"Virtual machines appear to an OS as real hardware but are just emulations"

Enterprise Solutions

When picking our three review products, we deliberately chose solutions that might appeal to home users, home workers, small businesses and schools. However, it should be clear that there are also massive benefits on offer to larger organisations. If the products reviewed here don't meet your requirements, you might like to look at some of the other virtualisation solutions offered by market leaders VMware (most notably VMware VDI – Virtual Desktop Interface) and Citrix (Xen Desktop). These software solutions create multiple virtual machines that can be accessed using either dedicated thin clients or low-powered PCs. Dedicated thin clients are available from several companies including Wyse, HP and Samsung and start at under £150, excluding the monitor. ■

Virtual PC 2007

Price Free download
Supplier www.microsoft.com/windows/downloads/virtualpc
Info www.microsoft.com/windows/products/winfamily/virtualpc
Updated reviews and pricing at www.techradar.com/463947

Virtual PC 2007 is a classic virtualisation tool that allows you to create virtual PCs into which you can install just about any x86-compliant operating system. You can also run pre-prepared virtual machines. Microsoft is currently offering a 30-day time-limited virtual machine of Windows Vista for evaluation purposes. Home versions of XP and Vista aren't included in the official list of supported host OSes, but there are reports that it will actually work despite being a licensing grey area.

This software doesn't really give the impression of being quite as polished as the VMware solution.

However, it does get one over in another area. Whereas VMware only lets you run pre-prepared virtual machines, Virtual PC offers the major advantage that you can install any guest operating systems for which you have the distribution media.

A drawback is that there is a noticeable processing overhead – actions in a guest operating system are slower than on the host. ■

PCPlus Verdict

★★★½☆

The virtual future
How virtualisation is changing business for the better, **page 24**