

Run virtual machines under Linux

VMWARE 3.0

VMware is the oldest commercial PC emulator for Linux. It has just been brought out in its newest version 3.0, which supports Windows XP. Hans-Georg Esser puts it through its paces

Even standard PCs, sold en masse through supermarkets and computer discount chains, are amply equipped today: Pentium 4s or AMD Athlons with 1.5GHz processors are common. The manufacturers are also generous when it comes to the working memory, with 256Mb RAM being pretty much a standard in today's climate. Such a system can, operated under Linux, easily allow for a second operating system using an emulator, such as VMware.

It comes at a price

VMware Workstation is anything but cheap. Those who use Linux mainly because most applications and updates can be acquired either cheaply or for free will not be too happy about the price tag of the version 3.0. It comes at £225 for the boxed version and £205 when downloaded from the Web server as a VMware archive (prices from <http://www.greymatter.com> or <http://www.qbsssoftware.com>). If you qualify under the educational heading then <http://www.pugh.co.uk> has it for £139 for the boxed CD or £119 for the key.

If you wish to purchase the product directly from USA, the prices are \$329 (plus delivery) for the boxed

set and \$299 for the download option. The good news for those of you who have the version 2.0 is that the update only costs £150/£120 (boxed/download version).

No-hassle installation

We tested the installation of VMware Workstation 3.0 under SuSE Linux 7.3 on a Pentium 4 1.4GHz with 256Mb RAM. The rpm package was installed with a simple `rpm -i ...`. As in the older VMware versions, the setup script command `vmware-config.pl` comes next. This installs the kernel modules necessary for operation and sets up the DHCP and Samba servers. These servers allow the guest operating system an automatic network configuration and (so that it is a Windows configuration) access to the user's Linux home directory.

The first use of the `vmware` command, that can now be carried out with normal user rights (no longer only with the administrator root rights), causes VMware to ask for the licence key.

Using the licence key, as well as the details of user name and company, VMware generates a licence file, located under `~/vmware/license.ws.3.0`. Old VMware 2.0 licence keys can no longer be used. By the way, in contrast to older versions, only one key can be used. This key runs out at the end of thirty days and can only be substituted by a full-blooded (and fully paid for) licence.

The VMware Configuration Wizard can be started as soon as the key has been activated. This initiates the set up of a new guest operating system. VMware Workstation 3.0 supports MS-DOS, Windows (3.11, 95, 98, Me, NT, 2000 Pro, 2000 Server, 2000 Advanced Server, XP Home Edition, XP Professional), Linux and FreeBSD (Figure 1).

Windows XP as a guest

We were primarily interested in testing the XP installation, as it is well known that VMware works well with older Windows versions. We therefore selected XP Professional and took on all the standard settings for the virtual drive and the network installation. Confirming the specifications will cause the Wizard configuration to close. Clicking Power On in the VMware window will then activate the virtual PC, which, after the normal BIOS set-up run and self

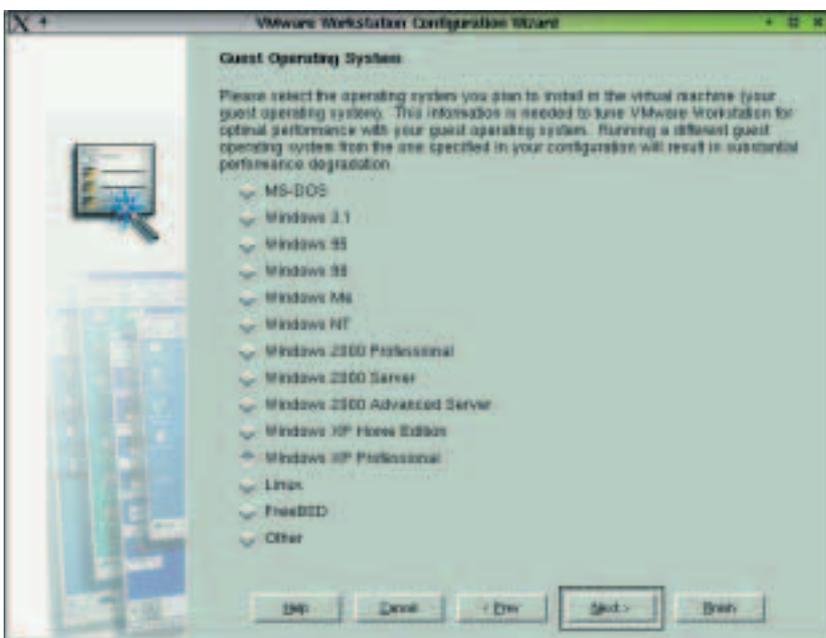


Figure 1: VMware Workstation 3.0 supports more guest operating systems than ever

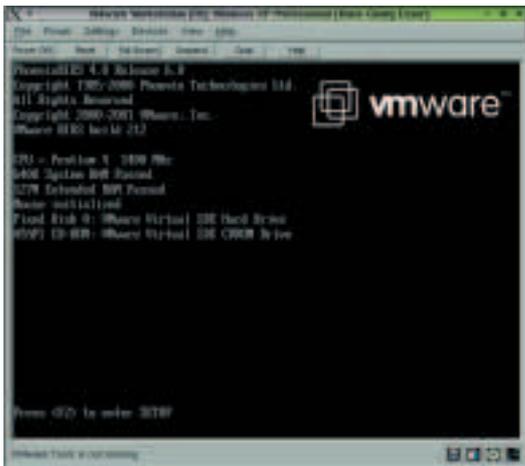


Figure 2: Looks like a PC, acts like a PC: starting the virtual computer

test, is booted from the Windows CD (Figure 2)

After the completely installed XP is started for the first time, there is not a lot to see, as the monitor is set to four bit colour depth –. Don't panic – the VMware Tools, integrated into VMware, can easily remedy this. Simply select the menu point Settings/VMware Tools Install (Figure 3) in VMware. After confirmation by clicking *Install* in a dialog window, a new virtual drive is integrated and XP automatically starts the setup program (that is saved on it).

XP seems to have some reservations about this graphic card drive and acknowledges this with a warning. Simply ignore this by clicking Continue Installation and the installation will continue without any further hitches. The new drive is activated immediately (no restart necessary!), so that moving the mouse outside the VMware window is not a problem and, thanks to an increase in the colour depth, the desktop display is back to what we would have expected.

In contrast to the earlier versions, this is really neatly done. The only thing you will want to change before starting work is the screen resolution (for example to 1024x768). This can be achieved through the properties dialog (context menu on the empty desktop). See Figure 4.

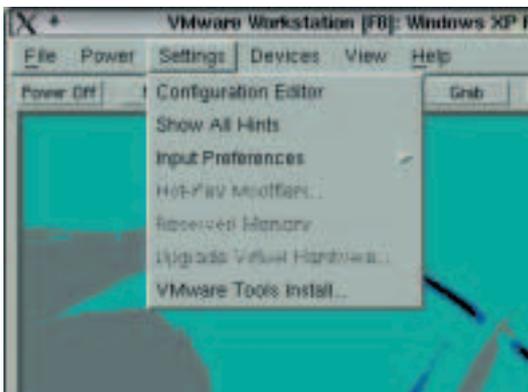


Figure 3: The "Insertion" of the VMware Tools disk is done through the menu

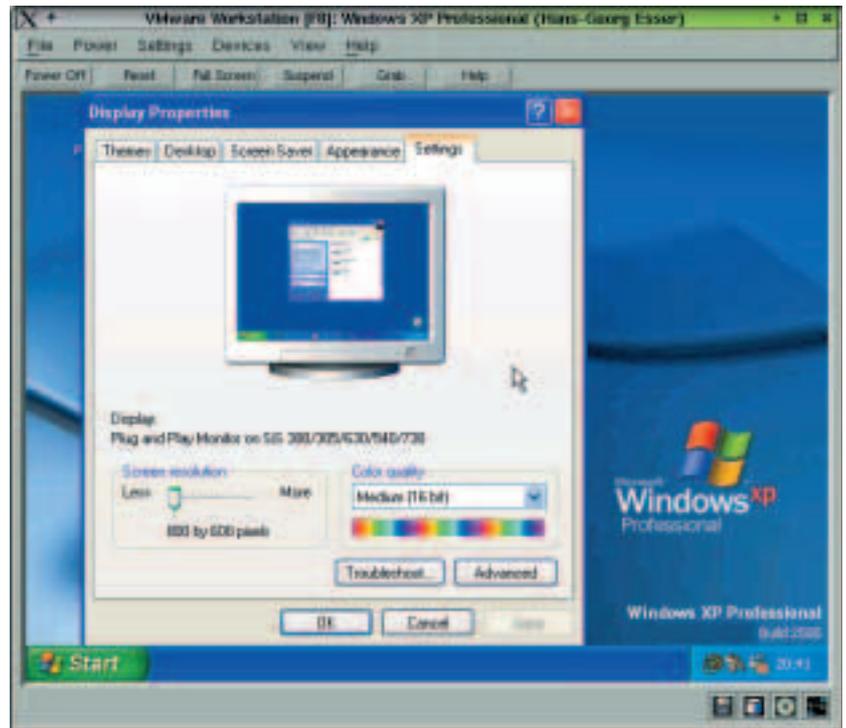


Figure 4: When the VMware Tools are installed, the resolution can also be set

Network

Out of the box, VMware supplies a DHCP server on the *vmnet1* virtual network interface. As the VMware network card is installed, XP is thereby supplied with an IP address and can access the host computer. VMware uses its own sub-network for this, which is separate from the normal network (which is created later). If you don't want this, because for example you want to be able to access an Internet gateway in the local network, you can also assign the guest system an address in the local network. The change in configuration takes place quickly under Windows XP:

- Open the system controls through Start/System Controls.
- Double click Network Connections.
- Click the LAN Connection icon.
- In the new window "Status of LAN Connection", activate the Properties button.
- A second window appears. Choose the "Internet Protocol (TCP/IP)" point on the list and click Configure.
- In the third (and last) window, "Properties", activate the IP address, sub-network, gateway and DNS server manual input, and enter the necessary data for the local network. The inputted IP address must naturally be up and running.
- Close all the windows (in the opposite order) by clicking OK or Close.

A reboot is not necessary here. XP allows (as did its predecessor Windows 2000) changes to the network configuration without the necessity of a restart. If

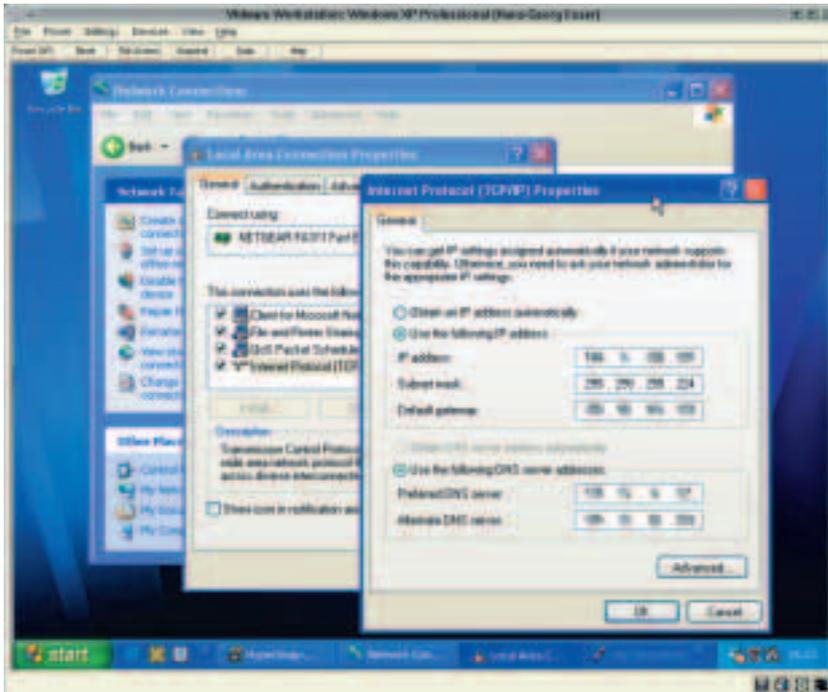


Figure 5: In order to be able to access the servers or gateways in the local network, simply modify XP's network settings.

everything has worked, you can check the network route in a console window: Start/All Programs/Accessories/Entry Request (Figure 6). You can then test the connection with the preinstalled Internet Explorer (Figure 7).

At long last, ISO images

To have more than one CD constantly available has always be a simple matter under Linux. All you need is to create a one to one copy (an Image) of a CD using:

```
dd if=/dev/cdrom of=/tmp/cd-image.iso
```

This can then be mounted at any time with:

```
mount -o loop /tmp/cd-image.iso /mnt/cdrom
```

VMware Workstation 3.0 allows this for its guest systems with a similar amount of ease. The "CD-ROM Image" device type can be selected in the configuration editor under SCSI or IDE Devices. After

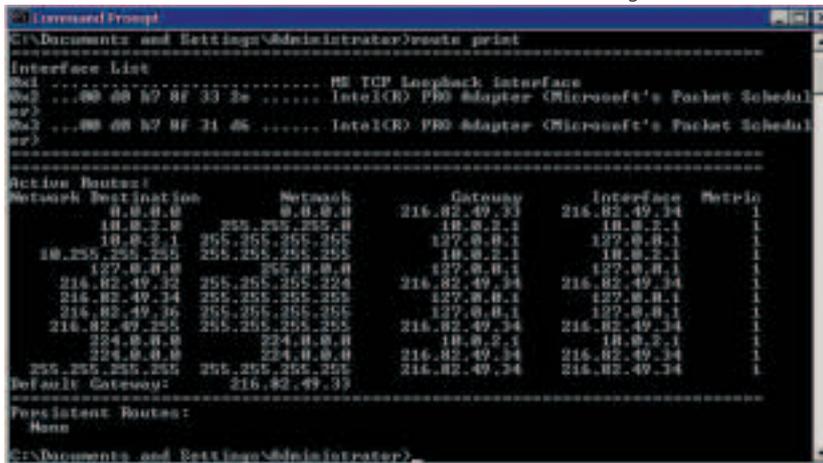


Figure 6: You can also check that the settings are correct by entering "route print" in the command line.

entering the image file name and clicking install, the CD image will be available the next time the virtual Windows is started under its own drive ID (letter). Figure 9 shows the image as an extra "E: Drive", although the normal DVD drive can of course continue to be used. Thanks to SCSI emulation, a whole selection of images can

thus be permanently incorporated.

From Windows' point of view, the ISO images are genuine CDs in physical CD drives. – Software which checks whether it was really started from a physical CD and not from disk or from the net can therefore be persuaded to work in this way.

Raw disks – IDE and SCSI

Is there yet another "native" Windows installation on your system in a FAT or a NTFS partition? If so, then you will be pleased about the possibility of simply integrating the real disk like a virtual one. To do this, go into the configuration editor and simply assign a free IDE or SCSI device with the appropriate device file (e.g. `/dev/hda` for the first IDE drive) and the type "Raw Disk". In principle, you can even do without the creation of a virtual drive and operate only with the real thing; a parallel boot up of the same Windows installation on the genuine and virtual computer will however probably fail due to large differences in hardware. The direct drive-access is



Figure 7: If the connection is OK, XP's Internet Explorer can also call up the Linux Magazine homepage

nevertheless advantageous, as this gives you the possibility of accessing the NTFS partitions of your computer from the guest system: NTFS filesystems can only be "read only" mounted under Linux, and even this often causes difficulties. In the test, the access to the real drive and two partitions created by Windows 2000 (NTFS and FAT) was possible without a problem.

By the way, read and write rights are necessary for the direct drive-access to the appropriate device files. In the case of SuSE Linux 7.3, this could be achieved using one of two methods:

- Admission of the user into the "disk" group. All members of the group disk can access the drive because the */dev/hda* file belongs to the root user and the disk group and has the "rw-rw-----" rights. Open the */etc/group* file as *root* and modify the line "disk: x: 6: " to "disk: x: 6: *username* ", whereby *username* must be adapted accordingly.

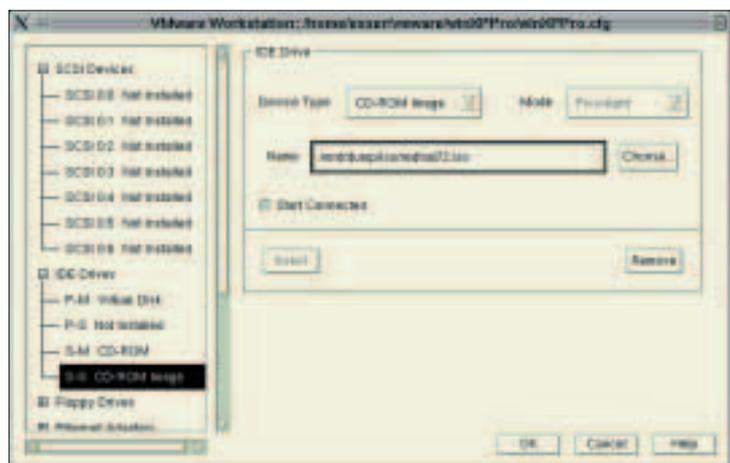


Figure 8: VMware now supports the integration of ISO images

- The second possibility is simpler but is only recommended on a single-user computer, as this gives every user full read and write rights to the disk: *chmod a+rw /dev/hda*.

What else is new?

The outstanding new feature of VMware workstation 3.0 is clearly the support of XP. We have already discussed some other features, and as well as these the new version also has:

- USB support, through which, for example, USB cameras that are not supported by Linux may be used,
- DVD support,
- NAT (network address translation): with this network alternative, the virtual machine shares the IP address with the Linux host. This on the one hand simplifies the set-up, but on the other hand leads to problems if both computers (host and guest) want to offer their services on the same port.

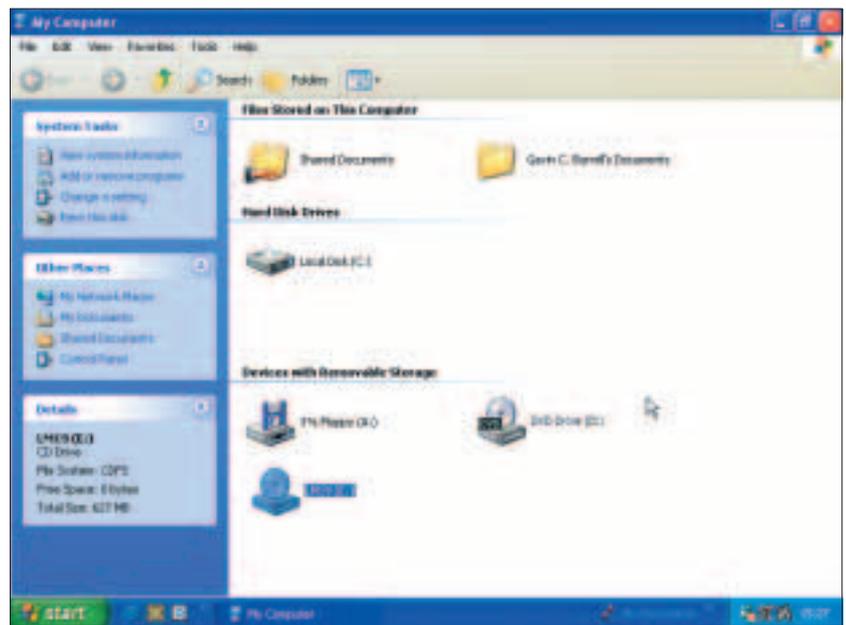


Figure 9: Under XP, the image is displayed as the "E: Drive", the DVD drive is denoted as D:

For this reason, the VMware manufacturer offers so-called "Guest OS Kits". These allow a guest operating system to be created faster, as the complete installation procedure has already been executed by VMware. In the case of Windows 2000 Professional (the only presently available version), the whole installation is taken care of merely by the entry of the serial number.

Performance

We installed VMware on a Pentium 4 1.4GHz. The program was executed both locally, as well as remotely from an available computer within the network. XP ran in the emulated computer at a sufficient rate in both cases; only in the remote access did the slowed screen construction lead to us waiting. Under normal application however, such as the start on the host computer, all features of the program worked smoothly.

The improvements of VMware workstation 3.0 over the predecessor make an update into an interesting proposition. – Hard to understand is the sharp increase in price. This makes VMware, as well as the need for an additional Windows license, into an investment of sizable magnitude. With the new prices, VMware has signalled its departure from the private user market. Perhaps a 3.0 version of VMware Express will also appear on the market in the not-too-distant future. VMware Express 2.0, which was available until recently, permitted the installation of Windows only as a guest system and was markedly cheaper.

VMware 3.0

Supplier	VMware Inc.
Price	£225/205
Web	http://www.vmware.com
For	Stable, performs well
Against	Now very expensive

rating