



# **Reviewer's Guide**

## **VMware 2.0 for Linux**

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Welcome to the reviewer's guide for VMware™ 2.0 for Linux®. On the following pages you will find several exercises to assist you with the installation, configuration, and evaluation of our new product. We thank you for your time and hope you enjoy reviewing and using VMware 2.0 for Linux.

Most of the exercises in this guide are designed so you can work through them on a stand-alone computer. The final exercise, which simulates a tech support environment, assumes that you have a network connection to a computer where you can store one or more large files — about 500MB each.

You can find extensive product documentation in the support section of the VMware Web site at <http://www.vmware.com/support/>.

If you encounter any issues in using the product, please contact [pr@vmware.com](mailto:pr@vmware.com).

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## About VMware

VMware is an application that gives you a fully functional PC in a window. Each of these fully functional PCs is a virtual machine, running directly on your host computer. With these virtual machines, VMware delivers flexible computing. That means

- Linux users can run Windows applications on Linux.
- Support organizations can save money by reproducing multiple end-user environments on a single PC.
- Developers and QA departments can test across a wide range of operating systems and PC configurations with much less investment in hardware and setup time.

Multiple virtual machines can run side-by-side. For example, users can simultaneously run Microsoft® Windows® 95, Windows 2000, and Linux.

With VMware, sharing files is easy — it works just as it does on any PC. VMware also lets you cut and paste from one virtual machine to another and between virtual machines and the host computer.

Instant Restore brings back the state of a running virtual machine in seconds. You can pop in and out of applications in a virtual machine as you need them — without going through a full boot cycle.

VMware's virtual disks allow new operating systems to be added without repartitioning. Virtual disks can be shared from a repository on a network file server — saving administration costs and storage overhead.

VMware supports full-screen, full-color graphics. Users are not limited to 256 colors. When running virtual machines, users can switch between full-screen mode and windowed mode with a hot key.

Each virtual machine is independent from the host computer — operations done in the virtual machine will not affect the host. A “blue screen of death” in a virtual machine won't affect the host computer at all.

VMware delivers all of these features in an easy to install and manage package. It's powerful stuff.

### What's New in Version 2.0?

With this new release, VMware improves the performance of virtual machines and adds a number of features to provide greater power and flexibility to users.

- Suspend to disk and Instant Restore let you put your virtual machine to sleep, then wake it quickly when you need to use it again. Your virtual machine picks up right where you left off, with the same applications and documents opening, and there's no wait for the virtual machine to boot up.
- SCSI support allows you to define virtual disks and CD-ROM devices as either SCSI or IDE, providing added flexibility for users who need to test software in a variety of configurations.
- Removable devices may be disconnected while the virtual machine is running. You can also disconnect the device and edit its properties, then reconnect it.
- VMware Tools for Linux and VMware Tools for Windows are installed from floppy image files that are included in the product.
- Samba is installed and configured automatically on the host when you install VMware 2.0 for Linux. This makes it simple for you to share files between a Linux host and Windows guests.
- Full-screen support is improved.
- Shrink disk lets you reclaim space that's not being used in a virtual disk file.
- Direct serial connections are supported.

- Sound input is supported and sound output is improved.
- Raw disk support is improved.

### **Why use VMware?**

The list of very practical uses of VMware is long, but here is a sample of users who may want to run multiple operating systems:

- Software developers who write software for different kernels or operating systems.
- Software developers and quality assurance staff who need to run different service pack levels for software testing.
- Web developers who want to install different Microsoft Internet Explorer versions in each virtual machine for Web site testing. Different Internet Explorer versions cannot be installed on a Windows operating system because of system registry conflicts.
- Technical and customer support staff who want to maintain multiple virtual machines, each configured to match different end-user operating systems and applications configurations. They can then quickly switch to whatever environment they need to try to reproduce a problem or work with a customer.
- Corporate IT organizations that insist users run the corporate “standard desktop” yet also allow users to install their own applications in a virtual machine “secure sandbox” without affecting the standard desktop.

### **Who Uses VMware?**

- Over 300,000 users worldwide.
- Users at IBM, HP, Rational, and Lucent access Windows applications from Linux.
- Network Associates, LinuxCare, and Excel.Net use VMware to improve technical support and help desk operations.
- Over 600 universities and research institutions use VMware.

### **The VMware product line**

VMware, Inc. currently produces two products. VMware 2.0 for Linux runs on Linux host computers. Users with Windows NT® 4.0 or Windows 2000 host machines can take advantage of this breakthrough virtual machine technology in VMware 2.0 for Windows NT and Windows 2000.

## Exercise I

# Installing and Getting Started with VMware

**Total estimated time to complete:** about 95-100 minutes

### Introduction

This exercise starts with installing VMware and follows through to completing the installation of a guest operating system. This is the longest of all the exercises, and most of that time is taken in installing a guest operating system inside a virtual machine. You'll need just a little longer to install a guest operating system in a VMware virtual machine than on a native host computer.

To get a jump-start, you can skip the installation steps and instead use a VMware Ready to Run virtual machine. Ready to Run virtual machines featuring several Linux distributions are available on CD-ROM. It takes about five minutes to set up a Ready to Run virtual machine.

Exercise I follows through the steps needed to get a VMware virtual machine and guest operating system installed, configured, and running. This exercise is divided into five parts:

- Installing VMware  
Time needed: about 5 minutes
- Configuring a Virtual Machine Using the VMware Configuration Wizard  
Time needed: about 5 minutes
- Installing a Windows 98 Guest Operating System  
Time needed: about 75 minutes
- Installing VMware Tools for Windows  
Time needed: about 10-15 minutes
- Using the Virtual Machine

We recommend that reviewers complete at least this first exercise.

A very quick way to install a guest operating system in a virtual machine is covered in Exercise IV, which simulates a tech support environment. In Exercise IV, you will use the virtual disk you create in Exercise I to conduct an almost-instant installation of a guest operating system over a network connection.

VMware for Linux can be installed on computers running Red Hat™ Linux 5.x, 6.0, or 6.1; Caldera® OpenLinux™ 2.2 or 2.3; SuSE™ Linux 6.0, 6.1, 6.2, or 6.3; or TurboLinux™ 6.0. To make the exercises easier to follow, we describe the steps you would follow on one specific host — a system running Red Hat Linux 6.0

Exercise I (B) steps through installing Windows 98 as a guest operating system inside a virtual machine. **You will need a Microsoft Windows 98 full version installation CD-ROM to work through this exercise; an upgrade version will not work.**

If you do not have a Windows 98 CD-ROM available you may also install Windows 95, Windows NT 4.0, Windows 2000 or any supported Linux distribution inside the virtual machine. In that case, follow along with the instructions in the exercises as a general guide to what steps to take, even if the details are different. Also refer to the detailed guest operating system installation notes at [http://www.vmware.com/support/linux/doc/guest\\_os\\_linux.html](http://www.vmware.com/support/linux/doc/guest_os_linux.html).

### System Requirements

VMware for Linux requires a host computer that meets the following system requirements:

Hardware requirements for the host machine

- Pentium® II 266 MHz and above recommended (Pentium class minimum)
- 96MB or more memory recommended
- Video adapter supported by the XFree86 Server (to take advantage of our full-screen option)
- 10MB of available disk space for installing VMware
- At least 500MB of free disk space for installing a guest operating system and applications

VMware does not run on non-x86 architecture computers such as Apple Power Macintosh or Sun Microsystems workstations.

#### Software requirements

- VMware host operating system requirements:  
Standard Linux distributions with glibc version 2 or higher and one of the following:
  - Kernel 2.0.32 or higher for non-SMP systems
  - Kernel 2.2.0 or higher for SMP systems

VMware will not run on systems that do not meet these requirements.

- VMware has been tested and is officially supported on the following host operating systems
  - Red Hat Linux 5.x, 6.0, and 6.1
  - Caldera OpenLinux 2.2 and 2.3
  - SuSE Linux 6.0, 6.1, 6.2, and 6.3
  - TurboLinux 6.0

VMware may run on other Linux distributions; attempting to do so is recommended for expert Linux users only.

- VMware requires an X server:
  - XFree86-3.3.4 or higher release
- Optional: Netscape Navigator or Communicator required for online help. VMware will install and work on a PC without the Netscape browser, but the context-sensitive HTML-based help will not be available.

The exact amount of memory required by VMware is really dictated by the guest operating system and applications that the user will run within a virtual machine. For most desktop applications 128MB is a good starting point if you are running one virtual machine and have applications active in the virtual machine and on the host.

Typical personal computers today — especially those used by power users, software developers, and similar users — exceed the minimum requirements for VMware. Pentium III-based PCs running at 600MHz are common among power users, and Celeron™ PCs running at 400MHz or faster power many sub-US\$1,000 PCs. Please be sure that the computer you are using to review VMware meets the minimum requirements.

**Note:** Some Cyrix processors such as the Cyrix 5x86 are not strictly compatible with the Pentium processor and do not include a Pentium processor instruction required by VMware. Later Cyrix processors do work with VMware.

## Exercise I (A) Installing VMware

**Estimated time to complete:** about 5 minutes

**Prerequisites:** You will need both the VMware installer and a license key for this version of the product. (Licenses for VMware 1.x for Linux will not work with VMware 2.0 for Linux. Also, licenses for VMware for Windows NT and Windows 2000 do not work with any version of VMware for

Linux.) You will find links to download the software and register for the evaluation license key at [http://www.vmware.com/download/download\\_linux\\_pre.html](http://www.vmware.com/download/download_linux_pre.html).

### If you upgrade

If you're already using VMware on your test computer, be sure to read the downgrade information on the VMware Web site before installing VMware 2.0.

**Note:** If you are currently using VMware 1.x for Linux on your test computer and think you may wish to return to that version after testing VMware 2.0 for Linux, review the downgrade instructions at [http://www.vmware.com/support/linux/doc/beta\\_linux/downgrade\\_linux\\_beta.html](http://www.vmware.com/support/linux/doc/beta_linux/downgrade_linux_beta.html) **before** you install the new version.

Installing VMware is simple — much like installing any other application on your computer. You may install using a gzipped tar file or an RPM installer downloaded from the VMware Web site. If you have the packaged distribution of the product, you will find both installation files included on the CD.

### Installing from a tar file

1. You should be logged on to your Linux host with the user name you will use when running VMware.  
In a terminal window, become root so you can carry out the initial installation steps.  
`su`
2. From the terminal extract the tar file you downloaded:  
`tar xzf filename.tar.gz` (where `filename.tar.gz` is the file you downloaded)
3. Change to the VMware installation directory  
`cd vmware-distrib`
4. Run the install script:  
`./vmware-install.pl`
5. Accept the default directories for binary files, library files, manual files, documentation files and init script.
6. When prompted to run `vmware-config.pl`, respond with Yes.  
This script can be used to reconfigure VMware whenever you upgrade your kernel. It is not necessary to reinstall VMware.
7. Acknowledge the end user license agreement (EULA). You may page through it using the space bar. If you do not get the "Do you accept ..." prompt, you may press Q to get to the next prompt.

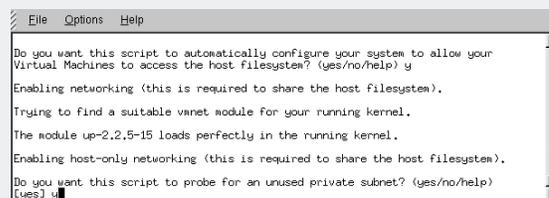


Figure 1 - 1a

8. Respond yes to the following prompts:
  - Do you want to use the network in your virtual machines?
  - Do you want to be able to use host-only network in your virtual machines?
  - Do you want this script to probe for an unused private subnet?
9. Press Enter to display the DHCP server copyright information.  
You may press the space bar to page through it, then press Q to continue to the next prompt.

### Networking note

For most of the exercises in this guide, you do not need a connection to an external network. Some do not involve any network activity. Others can use a virtual network running entirely on the host computer.

The final exercise calls for a connection to an external network.

In the installation and configuration instructions we suggest that you install all the VMware networking capabilities and initially configure your virtual machine for host-only networking.

10. Accept the defaults for the rest of the prompts.  
When prompted for a user name and password to use with Samba configuration, enter the user name you used in step 1 above.
11. When done, log out of the root account.  
`exit`

### Installing from an RPM file

1. You should be logged on to your Linux host with the user name you will use when running VMware.  
In a terminal window, become root so you can carry out the initial installation steps.  
`su`
2. From the terminal run the RPM file you downloaded:  
`rpm -i filename.rpm` (where `filename.rpm` is the file you downloaded)  
**Note:** If you are upgrading, the command is  
`rpm -Uhv filename.rpm` (where `filename.rpm` is the file you downloaded)
3. Run the configuration script:  
`vmware-config.pl`  
This script can be used to reconfigure VMware whenever you upgrade your kernel. It is not necessary to reinstall VMware.
4. Acknowledge the end user license agreement (EULA). You may page through it using the space bar. If you do not get the "Do you accept ..." prompt, you may press Q to get to the next prompt.

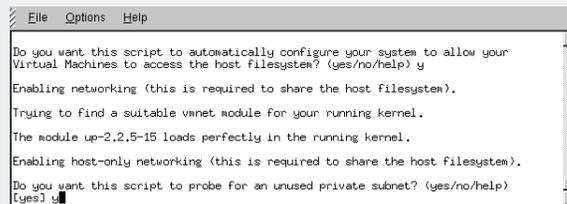


Figure 1 - 1b

5. Respond yes to the following prompts:
  - Do you want to use the network in your virtual machines?
  - Do you want to be able to use host-only network in your virtual machines?
  - Do you want this script to probe for an unused private subnet?
6. Press Enter to display the DHCP server copyright information.  
You may press the space bar to page through it, then press Q to continue to the next prompt.
7. Accept the defaults for the rest of the prompts.  
When prompted for a user name and password to use with Samba configuration, enter the user name you used in step 1 above.
8. When done, log out of the root account.  
`exit`

### Networking note

For most of the exercises in this guide, you do not need a connection to an external network. Some do not involve any network activity. Others can use a virtual network running entirely on the host computer.

The final exercise calls for a connection to an external network.

In the installation and configuration instructions we suggest that you install all the VMware networking capabilities and initially configure your virtual machine for host-only networking.

## Installing the VMware License

After completing the installation of VMware, you will need to install the VMware license.

The license you received is in an email file attachment (or on the distribution CD) as a text file. To install it, follow this procedure:

1. Change to your home directory  
`cd <Enter>`
2. If you do not already have a directory named `.vmware` (notice the leading dot), create one.  
`ls -al` (you should see a list of all directories; if `.vmware` exists, go to step 3)  
`mkdir .vmware`
3. Save the license file you received in the `.vmware` directory. Be sure the name of the file begins with `license` — in lower case.

## Exercise I (B) Configuring a Virtual Machine

**Estimated time to complete:** about 5 minutes

Start VMware by typing `vmware` from within a terminal.

1. Start the configuration wizard.  
When VMware is started, the startup screen has three options:
  - Run the Configuration Wizard.
  - Run the Configuration Editor.
  - Open an existing configuration.

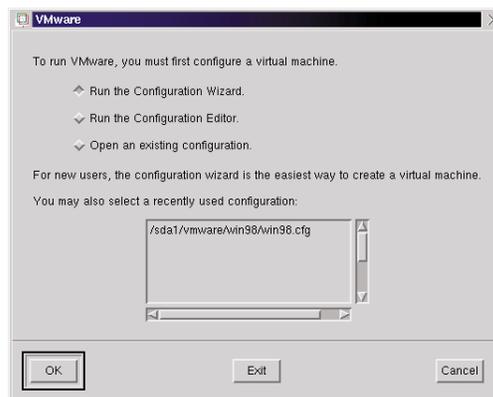


Figure 1 - 2

The default selection is Run the Configuration Wizard.

## Defaults

The default settings will give good results for a general-purpose configuration. For purposes of these exercises, there are a few places where you should select different settings. We will highlight those special cases.

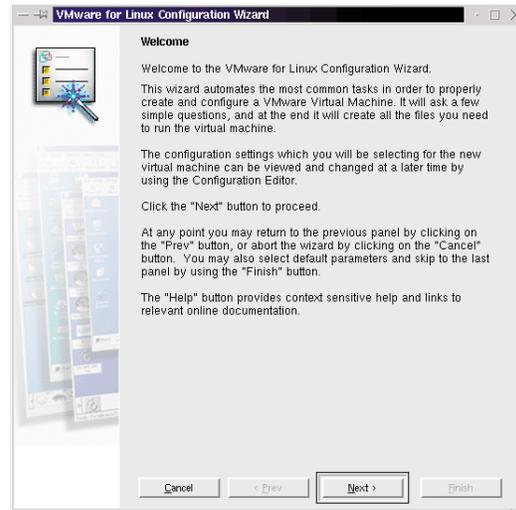


Figure 1 - 3

### Quick finish

When the Configuration Wizard has enough information to complete the configuration, the Finish button will no longer be dimmed. You can then click Finish to use defaults for all remaining options.

These options can be changed later using the Configuration Editor [Settings → Configuration Editor].

### Set disk size 2000

The size you set in this step limits the maximum size of the virtual disk. The actual file on your host machine will initially be quite small. It will grow as needed to hold the operating system, applications, and data files. Once this size is set, it cannot be changed.

Clicking the OK button starts the configuration wizard. The Configuration Wizard can also be started from the File menu (choose File > Wizard).

Clicking the Help button will open a pop-up window with context-sensitive help. That text will also include links to relevant help topics (text in blue — clicking on it will take you to the corresponding help topic).

2. Select an operating system.

The first screen asks which operating system will be installed in the virtual machine. The Configuration Wizard uses this information to select appropriate default values, such as the amount of memory needed. The wizard also uses this information when naming associated virtual machine files.

If the operating system you are using is not listed, select “Other” and give an appropriate name.

**For the purposes of this exercise, select Windows 98.**

### Selecting a Directory for the Virtual Machine

Each virtual machine should have its own directory. All associated files, such as the configuration file and the disk file, are placed in this directory. This screen lets you select the virtual machine’s directory.

**The default location for this exercise is the directory `~UserHome/vmware/win98` or `/home/UserHome/vmware/win98` where `UserHome` is the currently logged in user’s name.**

Virtual machine performance may be slower if your virtual hard disk is on a network drive. For best performance, be sure that the virtual machine’s directory is on a local drive.

3. Select the disk type.

**For this exercise, select Virtual Disk.**

4. Enter the size of the virtual disk.

**Fill in the size of the virtual disk that you wish to create. For this exercise, use the default of 2000 (megabytes).**

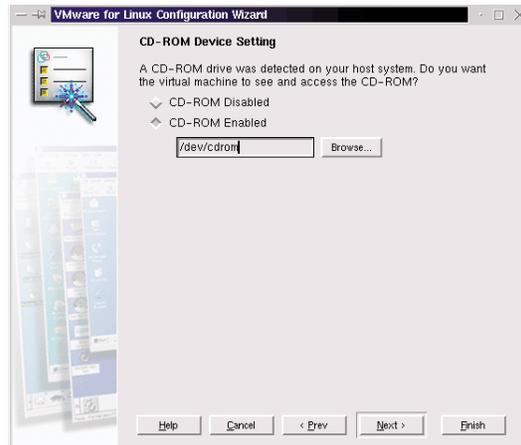


Figure 1 - 4

5. Enable the CD-ROM drive.

Select whether or not to allow the virtual machine to access the CD-ROM drive.

**Windows 98 requires the use of a CD-ROM for installation.**

**For the purposes of this exercise, select CD-ROM Enabled. Type in the path to the CDRom device, for example, /dev/cdrom.**

Even if the virtual machine has CD-ROM access enabled, you can disable access to the CD-ROM device later during the operation of the virtual machine by using the Devices menu. This is useful if you wish to control which of several running virtual machines is allowed to access the CD-ROM.

6. Enable the floppy disk drive.

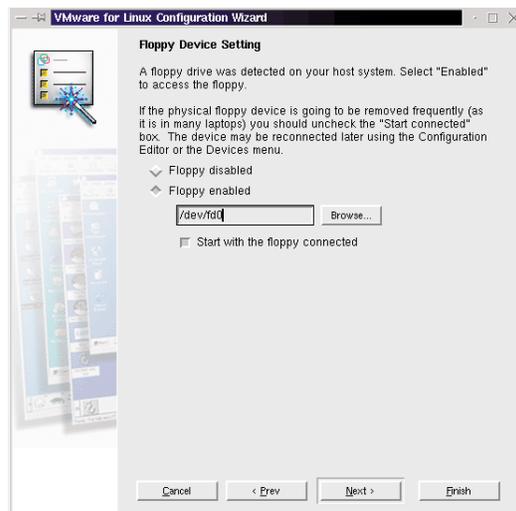


Figure 1 - 5

Select the Floppy Enabled option and choose the device that corresponds to your physical floppy drive, for example, /dev/fd0.

Note that some operating systems may require the use of a floppy drive during installation.

Even if the virtual machine has floppy disk access enabled, you can disable access to the floppy disk device later during the operation of the virtual machine by using the Devices menu. This is useful if you wish to control which of several running virtual machines is allowed to access the floppy disk.

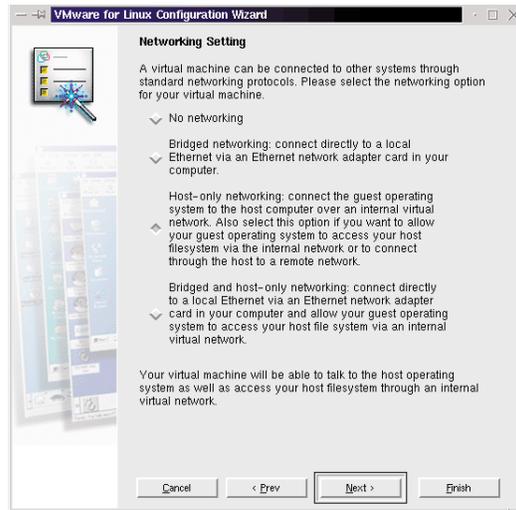


Figure 1 - 6

## Self-contained virtual network

For most uses, Bridged Networking is the simplest choice. However, selecting Host-only Networking in this step prepares you for Exercise III, which lets you explore VMware networking without a connection to a physical network.

7. Configure the networking capabilities of the virtual machine.

**For this exercise, select Host-only Networking.**

This screen lets you select the option that applies to this virtual machine.

**See Exercise III for more details about VMware networking options.**

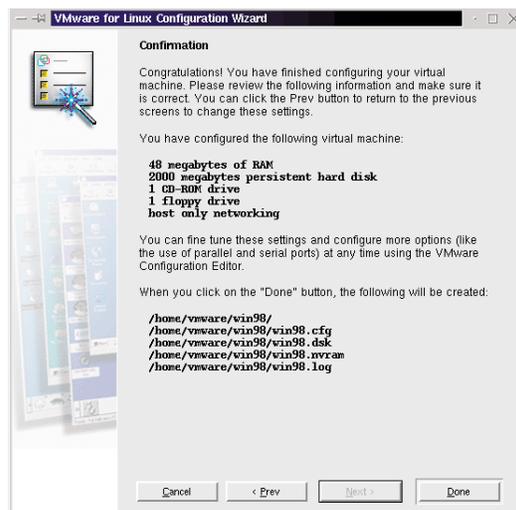


Figure 1 - 7

8. Review and finish the configuration:

This final screen presents you with all the options you have selected. Review it for accuracy and click the Done button to complete the virtual machine configuration.

If you want to change any of these settings, the Prev button will take you to the earlier screens, where you can make the changes.

Note that most configuration settings can be viewed and modified using the Configuration Editor, which you can find on the Settings menu (Settings > Configuration Editor).

## Exercise I (C) Installing a Windows 98 Guest Operating System

**Estimated time to complete:** about 75 minutes

To install the operating system on your virtual machine, you may follow this procedure:

1. Insert the Windows 98 CD in your CD-ROM drive.  
**Note:** If you cannot boot from your Windows 98 installation CD, also insert the bootable installation floppy disk in your floppy disk drive.

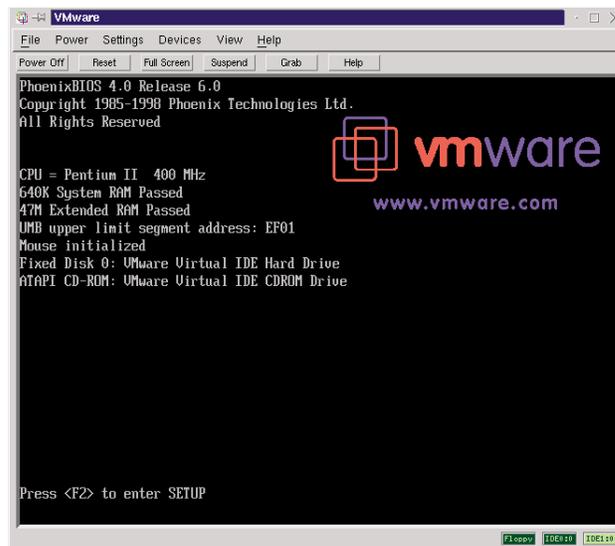


Figure 1 - 8

2. Power on the virtual machine (by clicking the Power On button). You will see the VMware BIOS identification, and the virtual machine will run the power on self test.
3. Click anywhere inside the virtual machine window and select Boot from CD-ROM when boot options are displayed.

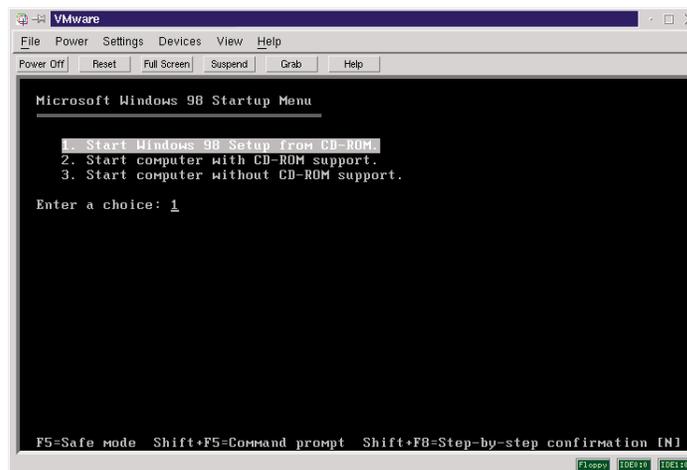


Figure 1 - 9

4. The virtual machine will boot from the Windows 98 CD-ROM and the Windows 98 Startup Menu will be displayed.

5. Select Start Windows 98 Setup from CD-ROM.



Figure 1 - 10

6. The Windows 98 Setup welcome screen will display.
7. Press Enter to continue installing Windows 98 in the same manner you would on a physical PC, with the following considerations:
  - a. During this session, the keyboard and the mouse are grabbed by the virtual machine. If you need to release the cursor, you may do so by pressing the Ctrl-Alt-Esc keyboard combination.  
 Note that Windows 98 Setup will detect the virtual devices rather than the physical devices installed in your computer.

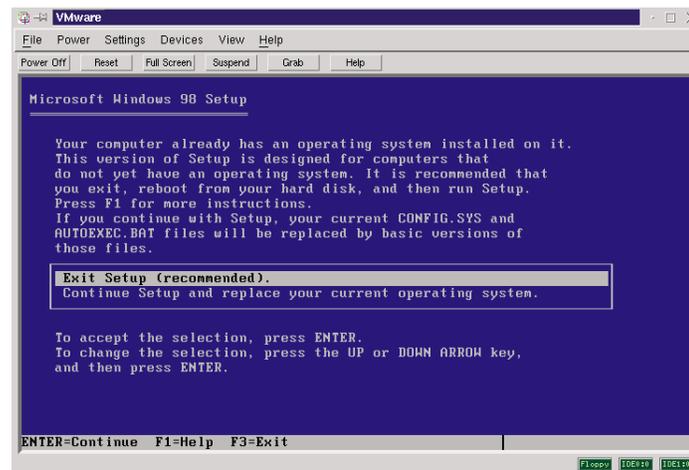


Figure 1 - 11

## Fdisk, format

You need to run fdisk and format during the installation, as if you were preparing a new, unformatted hard drive. These steps affect only your virtual disk, which is contained in a file on your host computer's file system. They do not repartition or reformat the physical hard disk on your host computer.

- b. When fdisk displays your hard disk information, it is actually referring to the virtual disk rather than your physical hard disk. Partitioning and formatting the virtual disk will NOT affect your physical hard disk partitions.

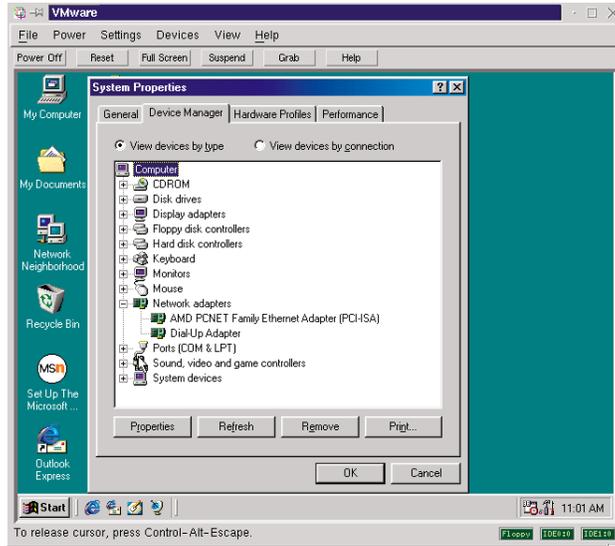


Figure 1 - 12

- c. The virtual network card that setup will detect is an AMD PCNET Family Ethernet Adapter.

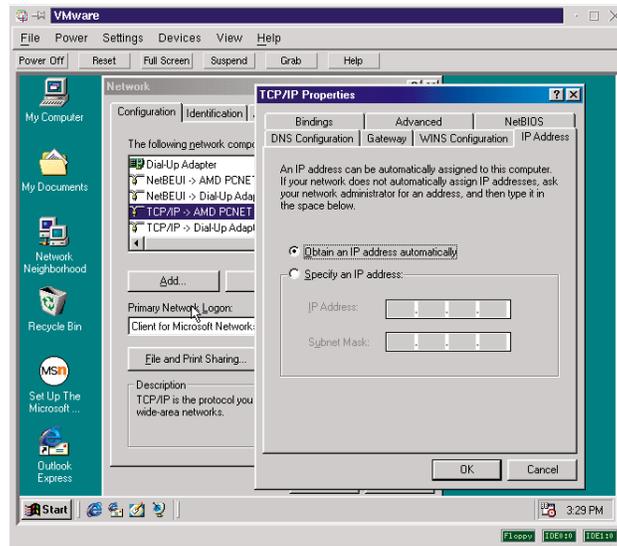


Figure 1 - 13

- d. Select TCP/IP as the network protocol and use DHCP. This will utilize the DHCP server installed during VMware installation.

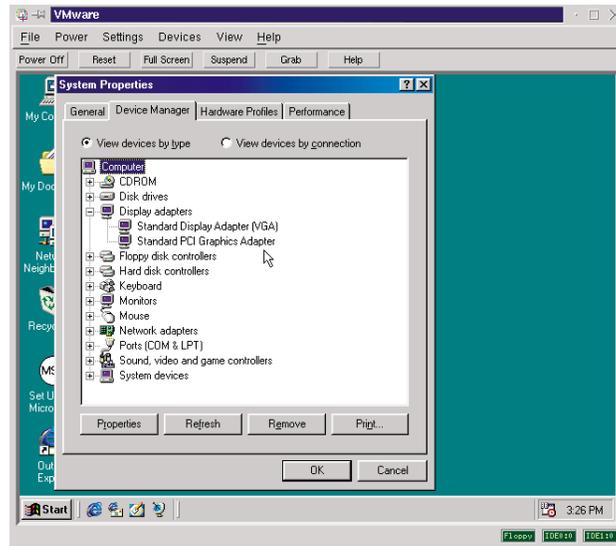


Figure 1 - 14

- e. The video card detected by setup is a VGA card. Accept the default selections, including the resolution and color. The VMware Tools provide enhanced graphics. You will install the tools in Exercise I(D).

### Exercise I (D) VMware Tools for Windows

**Estimated time to complete:** about 5 minutes

**Prerequisites:** complete Exercises I (A) through I (C)

#### Introduction to VMware Tools

With the VMware Tools SVGA driver installed, VMware supports up to 32-bit displays and high display resolution, limited by the capabilities of the host computer's display adapter. The VMware SVGA driver will also make use of 2-D hardware acceleration, significantly speeding up overall graphics performance within a virtual machine.

In addition to the SVGA driver, the VMware Tools package includes a small background VMware Tools utility that implements the following features:

- Text buffer for cut and paste between virtual machines and the host operating system and among virtual machines
- Control of the VMware mouse cursor behavior, allowing you to move the mouse cursor freely from the virtual machine window to the host machine's display and back
- The ability to connect VMware removable devices (such as floppy and CD-ROM drives) to the virtual machine — and disconnect them — from within the guest operating system
- The ability to shrink the virtual disk file to reclaim unused space
- Time synchronization between guest and host

These enhancements are available only when VMware Tools is running.

Installation files for VMware Tools for Linux and VMware tools for Windows are built into VMware (**Settings > VMware Tools Install**).

### Tools needed for best performance

It is very important that you install VMware Tools in the guest operating system.

Although VMware will run a guest operating system even if you do not install VMware Tools, the graphics environment within the virtual machine will be limited to VGA mode (640x480, 16 color). The graphics within the virtual machine will also be slow and make no use of any hardware acceleration. This graphics slowdown can make the virtual machine annoyingly slow.

VMware Tools are available for:

- Windows (Windows 95, Windows 98, Windows NT 4.0, and Windows 2000 all use the same VMware Tools)
- Linux
- FreeBSD

## Installing VMware Tools for Windows

The following instructions assume that this is the first time you have installed and configured VMware on the computer you are using for these exercises. If you previously installed an earlier version of VMware and wish to use a virtual machine you defined at that time, be sure that VMware Tools is *not* running when you install the upgrade.

To install VMware Tools in a Windows guest operating system:

1. Power on the virtual machine.
2. Reconfigure your virtual machine to install the VMware Tools.  
Choose Settings > VMware Tools Install
3. Double-click the My Computer icon on your desktop.
4. Double-click the A: drive.
5. Double-click `VMwareTools.exe` and follow the instructions.  
Instructions for configuring the video driver will open automatically in Notepad at the end of the installation process. If the Notepad window is hidden, bring it to the front by clicking the Notepad button on the Windows 98 taskbar. Follow the detailed instructions presented in the Notepad window.

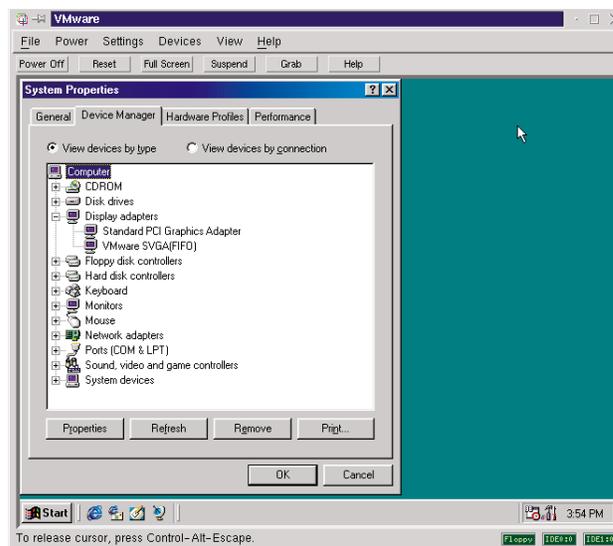


Figure 1 - 15

6. After restarting the Windows 98 virtual machine, open the device manager and verify that the display adapter is VMware SVGA(FIFO).  
You should notice the presence of a Standard PCI Graphics Adapter too.

## Configuring VMware Tools

VMware Toolbox is loaded to the system tray on startup.

To configure VMware tools:

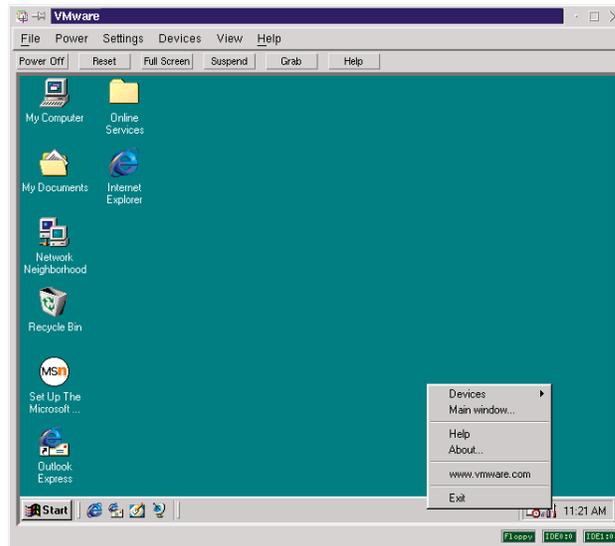


Figure 1 - 16

1. Right-click the VMware Tools icon in the system tray.
2. Click Options.... (The above two steps can be achieved by double-clicking the icon in the system tray.)

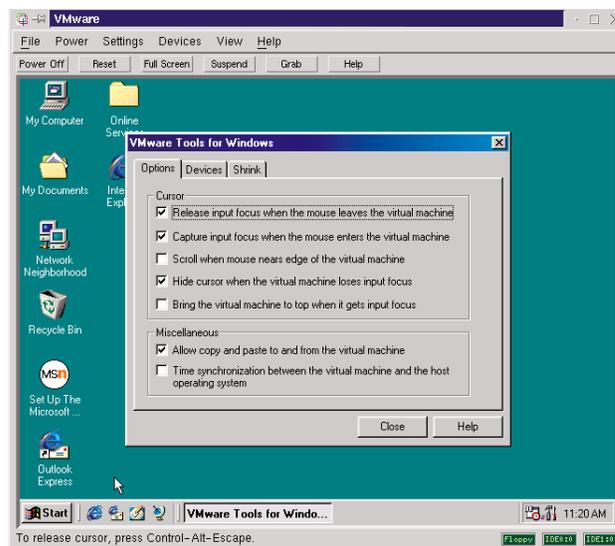


Figure 1 - 17

3. The VMware Toolbox cursor options are:
  - Release input focus when the mouse leaves the virtual machine
  - Capture input focus when the mouse enters the virtual machine
  - Scroll when mouse nears edge of the virtual machine
  - Hide cursor when the virtual machine loses input focus
  - Bring the virtual machine to top when it gets input focus

The VMware Miscellaneous Options are:

- Allow copy and paste to and from the virtual machine
- Time synchronization between the virtual machine and the host operating system (new

feature in this release)

4. The Devices tab of the VMware Toolbox options allows you to enable or disable removable devices. (You can also set these options by right-clicking the VMware Tools icon in the system tray, then clicking Devices, or navigate to them from the Devices menu of the VMware application.)

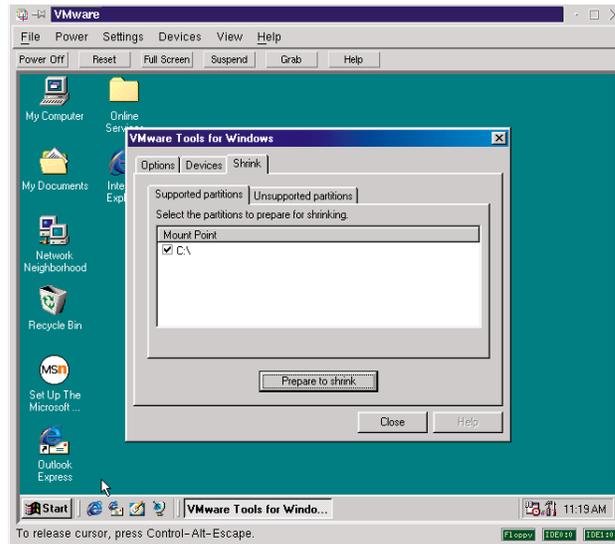


Figure 1-18

5. The Shrink tab gives you access to the settings you need if you wish to reclaim unused space in a virtual disk.  
**Note:** Shrinking a virtual disk may be a time-consuming operation.

## Exercise I (E) Using the Virtual Machine

### Shutting Down a Virtual Machine

To shut down a virtual machine, you may follow this procedure:

1. Choose Shut Down from the Start menu of the guest operating system (inside the virtual machine).
2. Select the “Shut down” radio button, then click OK.
3. After the guest operating system shuts down, it is safe to exit the VMware application.

### Starting a Virtual Machine

To start the virtual machine that you configured above:

1. Open a Terminal, type `vmware` and press Enter.

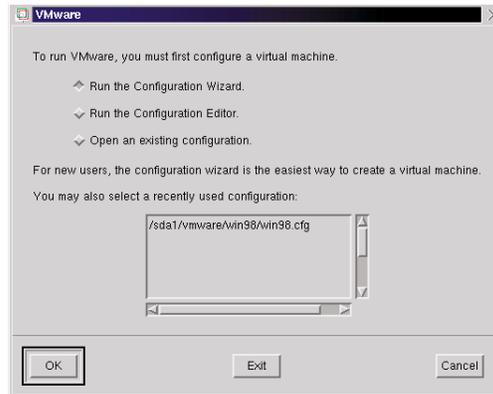


Figure 1 - 19

2. Select the “Open an existing configuration” radio button, then click OK.



Figure 1- 20

3. Browse to your virtual machine’s directory. Highlight the `win98.cfg` file, then click OK. Or if the configuration you want is listed among the recently used configurations shown in the dialog in figure 1-19, click the configuration file name to highlight it, then click OK.
4. Click the Power On button to power the virtual machine on.

## Quick switch

If you have several virtual machine configurations suspended to disk, you can move quickly from one to another.

Click **Suspend** to save the state of the current virtual machine. Then use **File → Instant Restore VMs** to display a list of quickly available virtual machines.

Or if you want to have both virtual machines running at the same time, just launch a new instance of VMware.

## Using Suspend and Instant Restore

In VMware for Linux 2.0, you can now save the current state of your virtual machine to disk. Then the new Instant Restore feature lets you quickly pick up work right where you stopped — with all the applications and documents you were working on open and at the ready.

The speed of the suspend and restore operations depends on how much has changed during your working session. In general, the first suspend will take a bit longer than later suspends do.

To suspend a virtual machine:

1. When the virtual machine you started in the last section is running, open WordPad.  
Start > Run  
WordPad
2. Type in a few words.

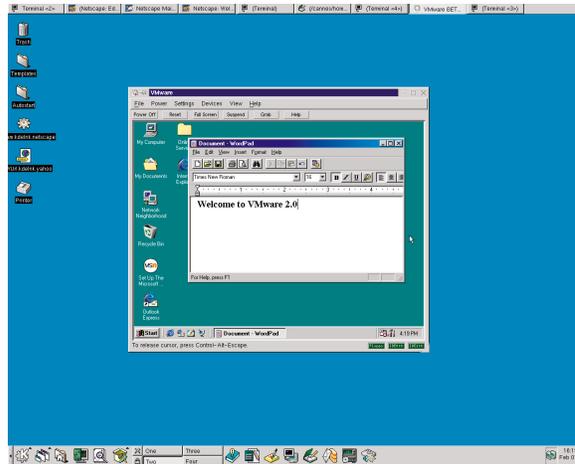


Figure 1 - 21

3. If your virtual machine is running in full-screen mode, return to window mode by pressing the Ctrl-Alt-Esc key combination.
4. Click Suspend on the VMware button bar.

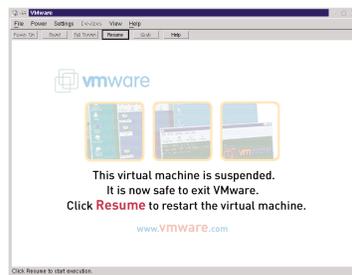


Figure 1 - 22

5. Quit VMware.  
File > Exit

To restore a virtual machine that you have suspended:

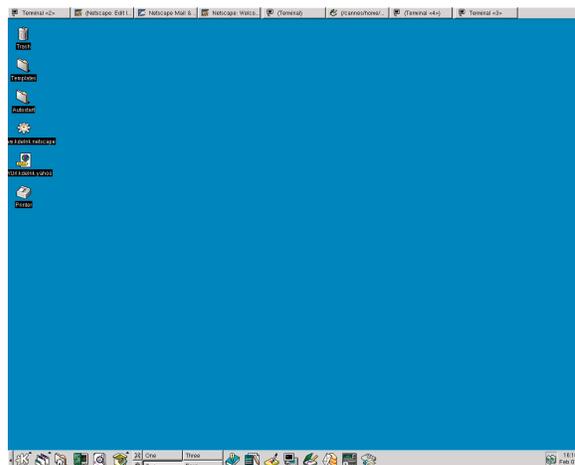


Figure 1 - 23

1. Start VMware and choose the virtual machine you just suspended. The process is the same as that described in steps 1–3 of Starting a Virtual Machine above.
2. Click Resume on the VMware button bar.

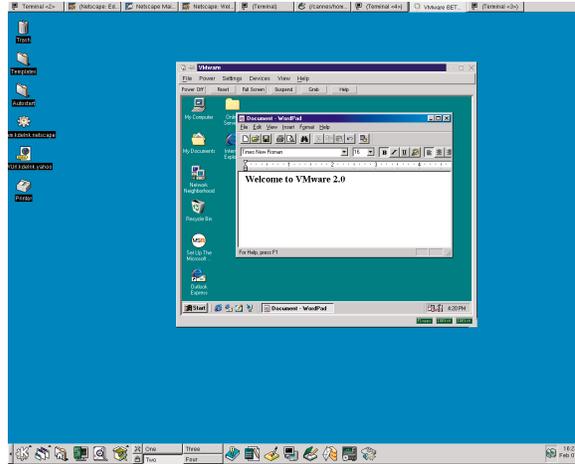


Figure 1 - 24

3. Note that WordPad is running and the text you typed before suspending the virtual machine is displayed.

## Exercise II

# VMware Virtual Machine Sharing

**Estimated time to complete:** about 5 minutes

**Prerequisites:** Exercises I (A) through I (D) completed

### Introduction to VMware Virtual Machine Isolation

VMware virtual machines provide a high degree of isolation from other virtual machines and from the host operating system. Installing software in the virtual machine, accidentally infecting a virtual machine with a computer virus or even having a virtual machine crash will not affect other virtual machines or the host operating system.

Although it provides a high level of isolation, VMware still allows convenient sharing when a user desires, including cutting and pasting, networking, and file sharing between virtual machines and the host operating system or between two or more virtual machines.

Exercise II will demonstrate simple sharing using cutting and pasting between a virtual machine and the host. In a later exercise you can see other forms of sharing between environments with VMware virtual networking and file sharing.

### Cutting and Pasting

Cutting and pasting is an example of the easy sharing between VMware virtual environments. The VMware Tools installed in Exercise I (D) provide the capability to cut and paste between one virtual machine and another or between a virtual machine and the host operating system.

In this exercise we will use a very simple example of copying and pasting between Microsoft WordPad and kedit on the guest and host operating systems. VMware's copy and paste functions allow a user to use the native copy and paste methods for a particular operating system.

1. Start VMware and power on the Windows 98 guest operating system if it is not already running.
2. Log in to Windows running inside the virtual machine as any user.



Figure 2 - 1

3. Check to be sure VMware Tools is running in the guest operating system. There will be a tools icon in the system tray (the default position is the right end of the taskbar) in the guest operating system.
4. On the guest operating system choose Start > Run and enter `WordPad`.
5. Start typing any text into WordPad.

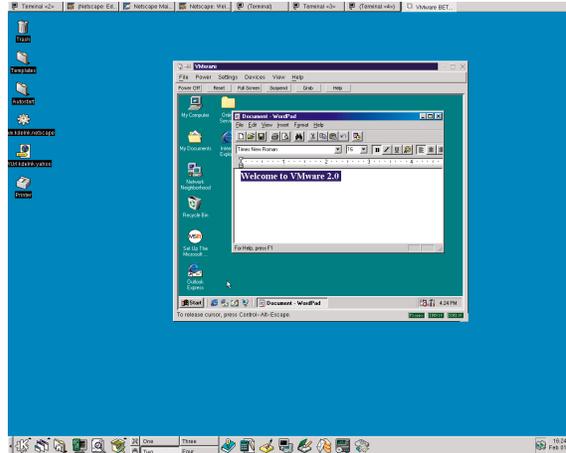


Figure 2 - 2

6. Select a range of the text you have entered and copy the text using Ctrl-C or the Edit > Copy menu item.
7. On the host computer open an editor — kedit, for example.

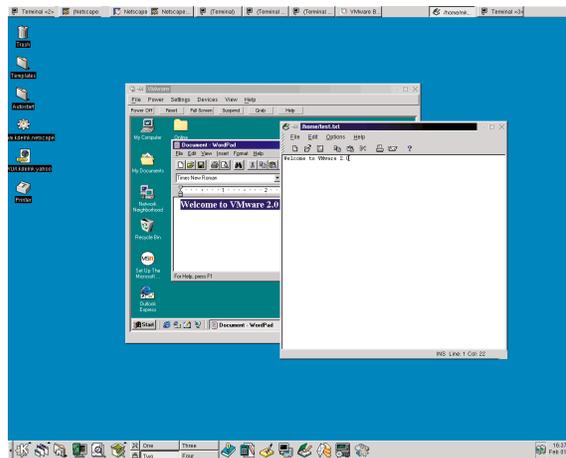


Figure 2 - 3

8. Click the middle mouse button inside the editor to paste the contents of the clipboard into the new file.
9. You can repeat this exercise going in the reverse direction by typing more text, copying this, then pasting it back into WordPad running inside the virtual machine.

## Exercise III

# Virtual Networking in VMware

**Estimated time to complete:** about 10-15 minutes

Each virtual machine can have its own distinct network configuration. There are four choices for configuring networking:

- No networking
- Bridged networking
- Host-only networking
- Custom networking

In this exercise, you will configure and test a host-only network. This will give you a chance to explore VMware's networking capabilities even if your test computer is not connected to a physical network. But first a quick description of the networking options in VMware.

### No networking

- The virtual machine is run in isolation.
- It will not be able to communicate with the host operating system.
- It will not be able to communicate with any other virtual machine running on the host.
- This option is useful if you desire complete isolation for testing or security purposes.
- To set up your virtual machine in this way, simply do not install a network interface adapter when configuring the virtual machine.

### Bridged networking

- The virtual machine runs on a virtual network that is connected to an existing physical network.
- It permits the virtual machine to appear as a full-fledged host on an existing physical network.
- The virtual machine may transparently use any of the services available on the network that it is bridged to: printers, file servers, gateways, etc.
- Any physical host, or other virtual machine configured with bridged networking, can use resources on that virtual machine.
- This is the most commonly used networking configuration.

### Host-only networking

- The virtual machine can communicate with the host operating system.
- It can also communicate with other virtual machines set up to use host-only networking.
- The virtual machine cannot communicate with any systems beyond the host machine without the use of a proxy server or IP masquerading.
- It utilizes VMware's DHCP daemon, installed on the host during VMware installation.

This networking type is most useful when:

- You want to isolate your virtual machines from systems outside the host computer.
- The host is not connected to any physical network.
- No Ethernet network adapter is installed on the host.
- The network adapter is something other than Ethernet (for example, Token Ring).
- A modem is installed and configured to dial to an Internet service provider.

### Custom networking

Refers to any network configuration other than those described above. This is outside the scope of this exercise.

### Configuring Host-Only Networking

To configure host-only networking you may follow this procedure:

1. Start VMware as outlined in Exercise I (E) using the Windows 98 configuration file.
2. Choose the Settings > Configuration Editor menu option.

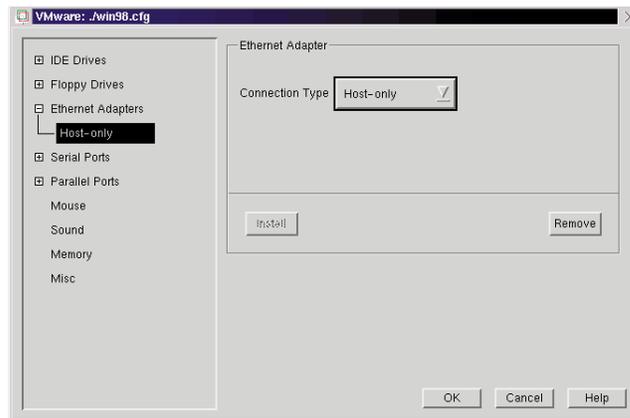


Figure 3 - 1

3. Expand Ethernet Adapters by clicking the + next to it.
4. Highlight Ethernet and select the Host-only Connection Type if is not already selected.
5. Click OK.
6. Choose the File > Save menu option to save the changes to the configuration file.
7. Power on the virtual machine (by clicking the Power On button).
8. After the Windows 98 guest operating system is started and you have logged in, right-click the Network Neighborhood icon on the desktop, then choose Properties

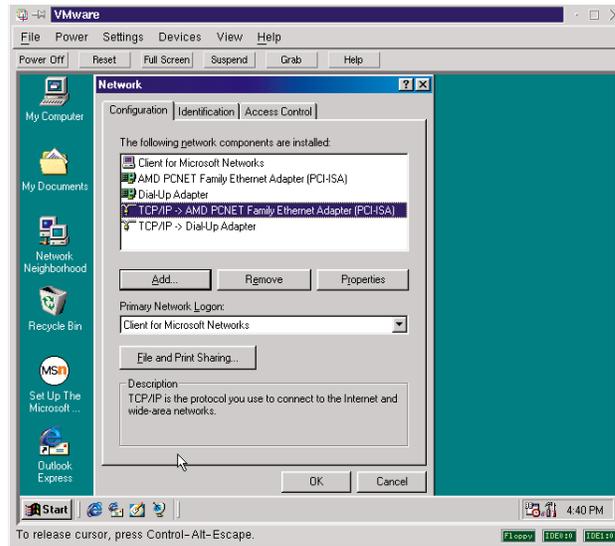


Figure 3 - 2

9. Select TCP/IP -> AMD PCNET Family Ethernet Adapter.
10. Click Properties.

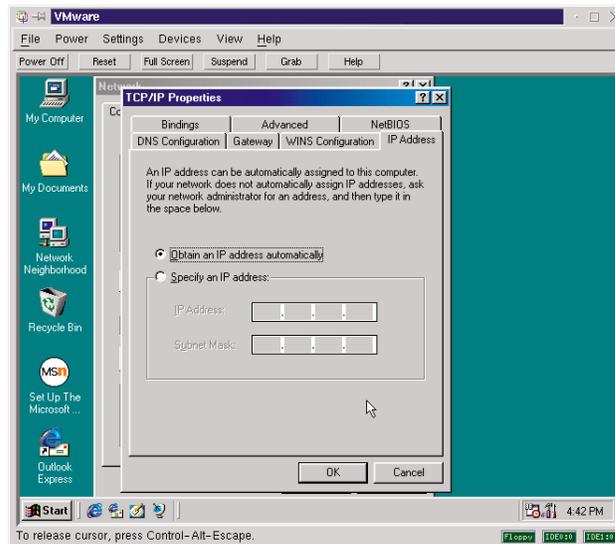
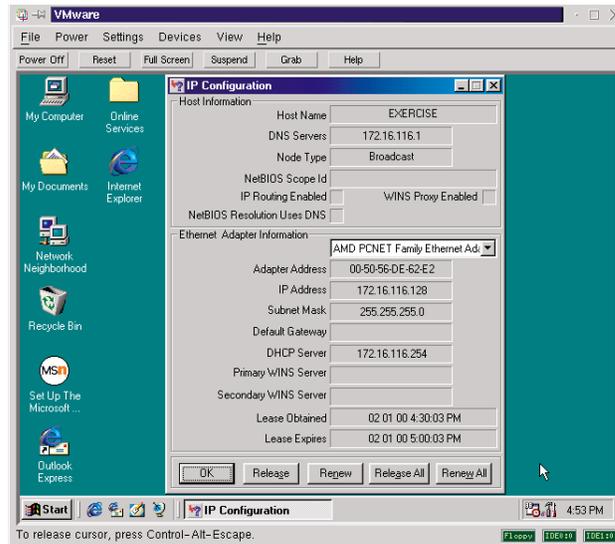
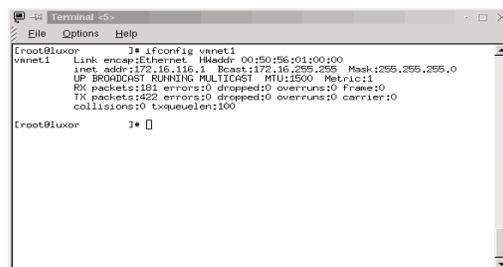


Figure 3 - 3

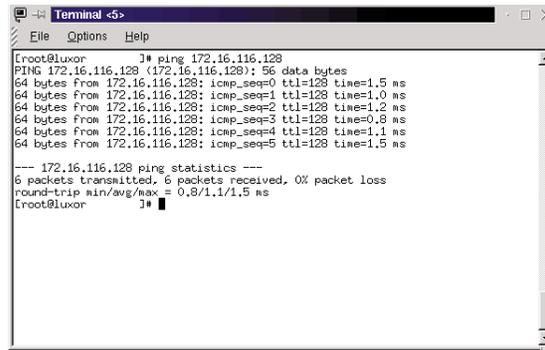
11. Verify that "Obtain an IP address automatically" is selected.
12. If you did not need to make any changes, click Cancel, then Cancel again. If you made any changes, click OK, then OK again and restart Windows 98 when prompted.


**Figure 3 - 4**

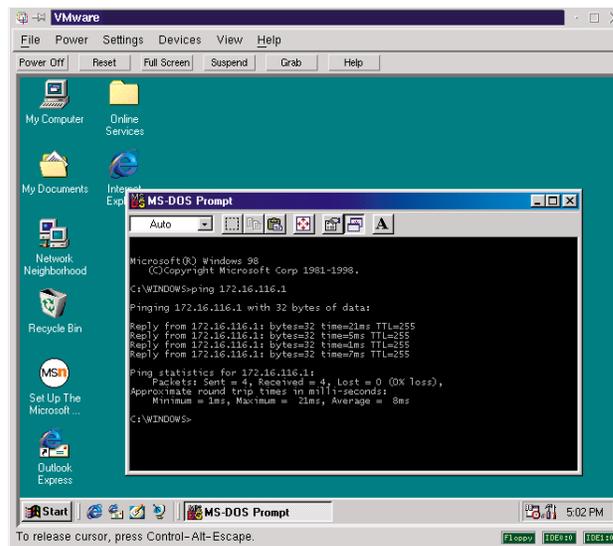
13. Choose Start > Run and enter winipcfg.
14. Select “AMD PCNET Family Ethernet Adapter” instead of the PPP adapter.
15. Verify that an IP address lease has been assigned (in our example it is 172.16.116.128).
16. Switch to the host operating system and open a terminal, then become root.  
su <enter> then type the root password


**Figure 3 - 5**

17. Run  
ifconfig vmnet1  
Vmnet1 is the virtual Ethernet adapter used for host-only networking (in contrast to bridged networking, which uses vmnet0 as the virtual Ethernet adapter).
18. Also notice that the host's IP address is the first in the subnet (in our example, the IP address is 172.16.116.1 and the network number is 172.16.116.0 based on subnet mask of 255.255.255.0).
19. Another important item to notice is that the guest operating system is acquiring its IP lease from a DHCP server whose IP address is the last in the above subnet (in our example it is 172.16.116.254).


**Figure 3 - 6**

20. While still at the host's terminal, ping the virtual machine's IP address. It should respond successfully.
21. Exit the terminal.


**Figure 3 - 7**

22. Switch back to the guest and open a command prompt. Ping the host's IP address. It should respond successfully.
23. Exit the command prompt.

You have now seen the virtual network in action. You may use any services available on the network. For example, if you have a Web server running on your host, you can browse its pages from a Web browser on the guest, or vice versa. Or you can share files between host and guest using Samba. When you install VMware 2.0 for Linux, Samba is configured automatically so it will support file sharing between the Linux host and a Windows guest operating system.

24. On your host machine, verify that you have configured Samba using the IP address of the virtual Ethernet adapter mentioned in steps 17 and 18 above.
  - Switch to the host.
  - Start a terminal.
  - Become root
  - su
  - Issue the following command and examine the content for the IP addresses you found in step 18.
  - less /etc/vmware/vmnet1/smb/smb.conf

25. If you have configured Samba on your host before installing VMware, stop it before proceeding. To stop the Samba service:
  - a. `su`
  - b. `/etc/rc.d/init.d/smb stop`
26. On your virtual machine do the following:
  - a. On the Windows 98 virtual machine, double-click Network Neighborhood and browse to the host computer's icon.
  - b. The shares on the host should appear similar to those shown in figure 3-8 below.



**Figure 3 - 8**

27. You may copy files back and forth from host to guest just as you would between two computers on a physical network.

## Exercise IV

# Sharing VMware Virtual Disks on a Network

Estimated time to complete: about 20-30 minutes

### Introduction to VMware Disk Capabilities

VMware supports two disk types: existing disk partitions (also known as raw disks) and virtual disks.

Virtual disks are particularly convenient for many users — for example, technical support representatives or quality assurance groups — because they encapsulate a virtual machine in a file on the host computer's file system. This file can then be stored on a file server or CD-ROM for later use and can be shared with other users. A variety of operating systems and system configurations can be maintained as virtual disk files for quick access by anyone in the group.

A virtual disk file created under VMware for Linux can be used under VMware for Windows NT and Windows 2000 and vice versa.

A VMware virtual machine can use disks in three modes: persistent, nonpersistent, and undoable. The default mode is persistent. Persistent disks behave as conventional disks do, with changes made permanently. With nonpersistent disks, changes are discarded at the end of each session. Undoable disks allow users to choose whether to keep or discard changes.

In this exercise you will see how to change disk modes, then set up client and server computers for easy sharing of virtual disks.

### Protect your work

Many VMware users routinely use undoable disk mode as an easy way to protect their system configurations.

When you have your virtual machine set up in a way you like, commit all changes as outlined in this section.

You should also click the Commit button any time you shut down a session where everything worked as you wanted it to.

Or if you're not sure about changes you made, click Keep. This lets you decide later whether to commit or discard the changes.

But if something goes wrong — errors while installing a program, document changes you wish you hadn't made, even a system crash — shut down the virtual machine and click Discard instead. Next time you start your virtual machine, you'll be back were you were before the session that spelled disaster.

### Exercise IV (A)

#### Configuring an Undoable Disk

To configure a virtual machine to use undoable disk mode, you may follow this procedure:

1. Start VMware and choose the virtual machine you configured in Exercise I.
2. Choose the Settings > Configuration Editor menu option.

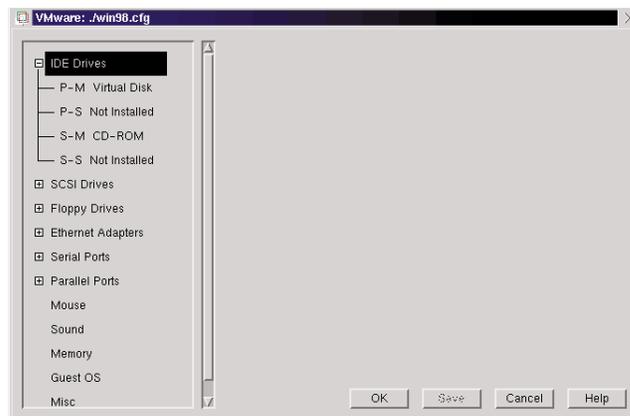


Figure 4 - 1

3. Expand the IDE Drives tree by clicking the + next to it.

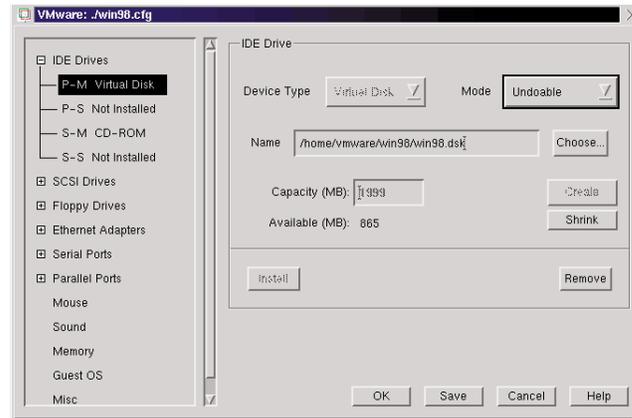


Figure 4 - 2

4. Select the drive P-M Virtual Disk and choose Undoable from the pick list.
5. Click Save to save the changes to the configuration file.
6. Power on the virtual machine (by clicking the Power On button).
7. After the Windows 98 guest operating system is started and you have logged in, locate the Win98 virtual machine directory and list its contents. Notice the presence of a new file called win98.dsk.REDO. This is the redo log, which temporarily stores changes you make during your work session.
8. Install an application of your choice on the virtual machine. Use something that doesn't take long to install, because you will discard this application in one of the following steps.
9. Shut down Windows 98 on the virtual machine and click the Power Off button.



Figure 4 - 3

10. You are prompted with three possible actions for the redo log:
  - Commit
  - Discard
  - Keep
11. Click Keep.
12. Power on the virtual machine.



Figure 4 - 4

13. You are prompted with four options for the redo log:
  - Commit: to commit the contents of the redo log to the virtual disk
  - Discard: to discard the contents of the redo log and start with a new log
  - Append: to append new changes in this session to the existing log
  - Cancel: to cancel the redo operation, after which you will have an option to cancel the session or continue with the disk disabled
14. Click Append

15. After Windows 98 has started and you are logged in, check for the application you installed in step 8 above. Notice that it is still installed.
16. Shut down Windows 98 and power off the virtual machine.
17. You are again presented with the same dialog as in step 10 above.
18. Click Keep.
19. Power on the virtual machine.
20. The dialog listed in step 13 above is now displayed. Click Discard.
21. After Windows 98 has started and you are logged in, check for the application you installed in step 8 above. Notice that it is no longer there.
22. Install an application that you want to keep.
23. Shut down Windows 98 and power off the virtual machine.
24. Click Commit. A progress bar will appear while the changes are committed to the virtual disk.
25. Power on the virtual machine.
26. Notice that you no longer see the dialog listed in step 13.
27. After Windows 98 has started and you are logged in, check for the application you installed in step 22 above. Notice that it is still installed.
28. Shut down Windows 98 and power off the virtual machine.
29. Click Commit.

### Exercise IV (B) Sharing Virtual Disks from a Network Drive

In this exercise you will go through the basic steps needed to set up virtual disks so they can be shared from a network drive. Shared virtual disks are important time-savers for VMware customers like Internet service provider Excel.Net.

“VMware lets us quickly fire up a virtual machine to match the customer’s configuration,” says Excel.Net President Larry Weidig. “It’s great for customer support.”

#### Reference library

The customer support group at Excel.Net has a shared file server that contains virtual disks with the many operating system and browser combinations their customers use. Each customer support representative has VMware installed and can use any of the virtual disks to replicate the customers’ environments.

For example, one user may call and have Windows 95 running Microsoft Internet Explorer 4, while the next customer will have Windows NT and Internet Explorer 5. It is invaluable to be able to step through exactly what the user sees, since the network configuration dialogs are different on each operating system.

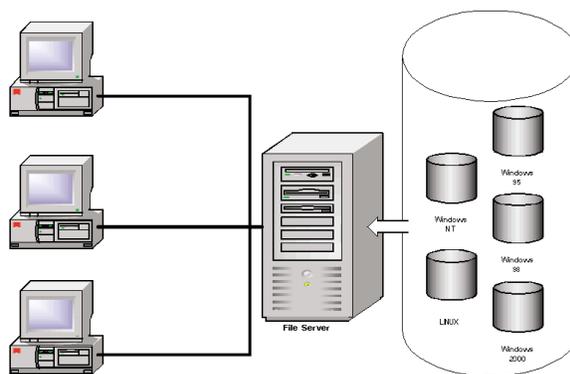


Figure 4 - 5

In this exercise, you will store virtual disk files on a network drive and set up a client computer to use that virtual disk without changing the shared files. You will need to copy some files to the network server and modify your VMware configuration to run the virtual machine from the server.

1. Locate the virtual machine directory you created in Exercise I (in our example it was /home/username/vmware/win98). You should have the following files among others:
  - Win98.cfg (the virtual machine's configuration file)
  - Win98.dsk (the virtual disk file)
2. Mount a network drive on which you will store the files.
3. Copy the .cfg and .dsk files from the directory identified in step 1 to the mounted network drive.
4. CD into the mounted drive and directory, then assign the group you will use as VMware users read-write access to the .dsk file.
5. Start VMware using the .cfg file on the network drive.  
`vmware win98.cfg`
6. Start the Configuration Editor (Settings > Configuration Editor).

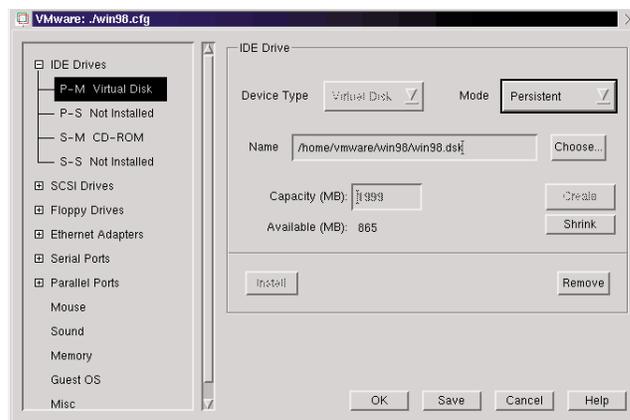


Figure 4 - 6

7. Expand the IDE Drives tree, then highlight P-M Virtual Disk.
8. Notice that the virtual disk name field is still pointing to the original path.
9. Edit the above path to reflect the new location on the network. In our example /mnt/vdisks/win98/win98.dsk, where vdisks is the mounted network drive.

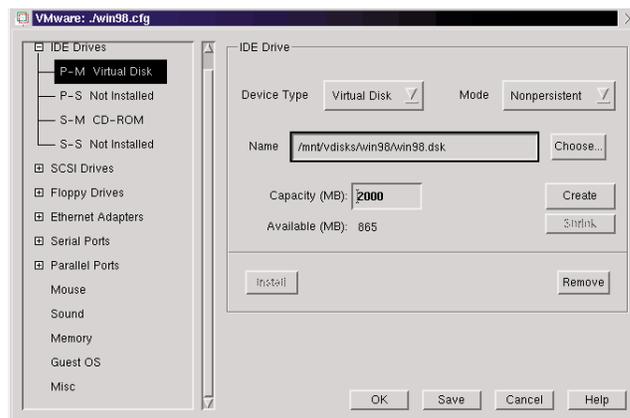


Figure 4 - 7

10. Change the virtual disk mode to Nonpersistent.

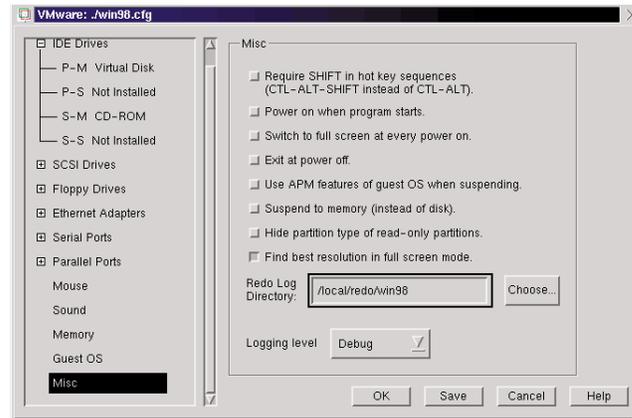


Figure 4 - 8

11. To improve disk I/O performance, set the redo log directory to a local drive. To do so:
  - a. Click Misc in the left pane.
  - b. In the Redo Log Directory field type in the path to a directory on the local drive.

In our example, the directory is on `/local/redo/win98`.

**Note:** You set the disk mode to nonpersistent because multiple users will be modifying the disk at the same time. You want to prevent their modifications from being committed to the disk. This is the safest method for sharing the same virtual disk.

If you want to allow users to keep their changes between sessions (but not commit the changes to the shared virtual disk), you can do the following:

- c. Set the disk mode to undoable. You can do that by selecting Undoable instead of Nonpersistent in step 10 above.
  - d. Change the file attribute of the shared `.disk` file to read only.  
This will allow the users to keep their changes but not commit them to the virtual disk.  
**Note:** If you use undoable disk mode, only one user at a time will have access to a given virtual disk file.
12. Click Save to save the changes you made to the configuration file.

### Set Up the User's Workstation

The user's workstation is the computer where you installed VMware in Exercise I. At that computer, do the following:

1. The following steps assume you have installed VMware as outlined in Exercise I.
2. Create a directory on the local drive named `/local/redo/win98` and another named `~username/vmware/win98` (where `username` is the user's login name).
3. Mount the network drive where you stored the virtual machine files.
4. Log out from root and then log in as the user.
5. Copy the CFG file from the network drive to the `~username/vmware/win98` directory.
6. Start VMware using the local configuration file.  

```
cd ~username/vmware/win98
vmware win98.cfg
```
7. Power on the virtual machine.
8. If you are using nonpersistent mode, you should receive the following dialog:

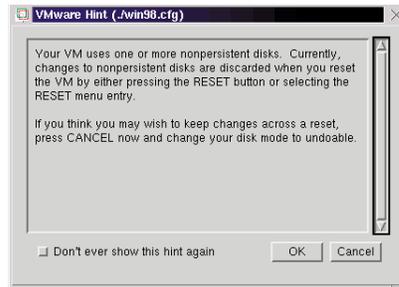


Figure 4 - 9

9. This is a reminder that when you are using the nonpersistent mode, all changes will be discarded when you reset the virtual machine.



Figure 4 - 10

10. The above dialog will appear. It is a standard dialog whenever the virtual disks are on a mounted network drive
11. If you are using undoable disk mode (flagged read only), you should receive this dialog instead:



Figure 4 - 11

12. Click OK.
13. Verify that Windows 98 boots successfully.
14. Shut down Windows 98.
15. If you are using undoable disk mode, you will receive this dialog:



Figure 4 - 12

16. Click Keep. You will not be allowed to commit the contents of the redo log since the DSK file has already been flagged read only. Otherwise, click Discard and your virtual disk will revert to its original form the next time you start this virtual machine.

17. The next time this virtual machine is restarted, you will receive the following dialog if you did not discard the redo log.



Figure 4 - 13

18. Click Append to allow the new session to add the changes to this redo log. Otherwise, click Discard to start the virtual disk in its original form (as if this were the first time you were using it).

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