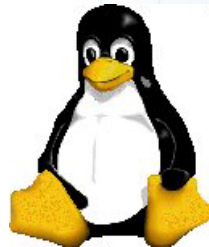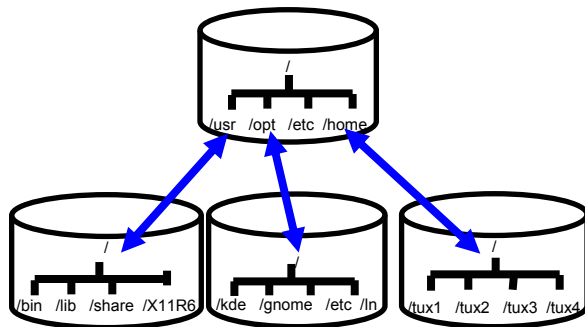# Integrating Linux in a Windows environment

Unit objectives
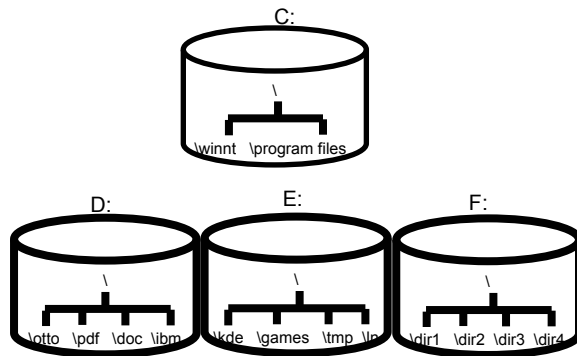
After completing this unit, you should be able to:

- Access Windows-based file systems
- Run Windows programs
- Access Windows servers
- Read Windows document formats

Differences in file systems

- Linux: Unified file system
  - Virtual directory tree
  - All physical file systems are mounted

- Windows: Drive letters for each separate file system

Mounting Windows file systems

- To mount the first primary partition on your first hard disk on the mount point /mnt/winC, do the following.

```
# mount /dev/hda1 /mnt/winC
...or
# mount -t vfat /dev/hda1 /mnt/winC
```

- All files on your C: disk are now accessible in /mnt/winC.
- Make this permanent by adding this to /etc/fstab:

```
/dev/hda5  /          ext2  defaults  1 1
/dev/hda2  /boot      ext2  defaults  1 2
/dev/hda6  swap       swap  defaults  0 0
/dev/hda1  /mnt/winC  vfat  defaults  0 0
```

Accessing Windows file systems directly

- mtools is a collection of tools that can read/write Windows file systems directly using drive letters.

```
# mcopy c:autoexec.bat /root/autoexec.bat
# mformat a:
# mdir a:
```

- Devices must not be mounted!
- Drive letters are mapped to physical devices in /etc/mtools.conf.

```
drive a: file="/dev/fd0" exclusive 1.44m mformat_only
drive c: file="/dev/hda1"
```
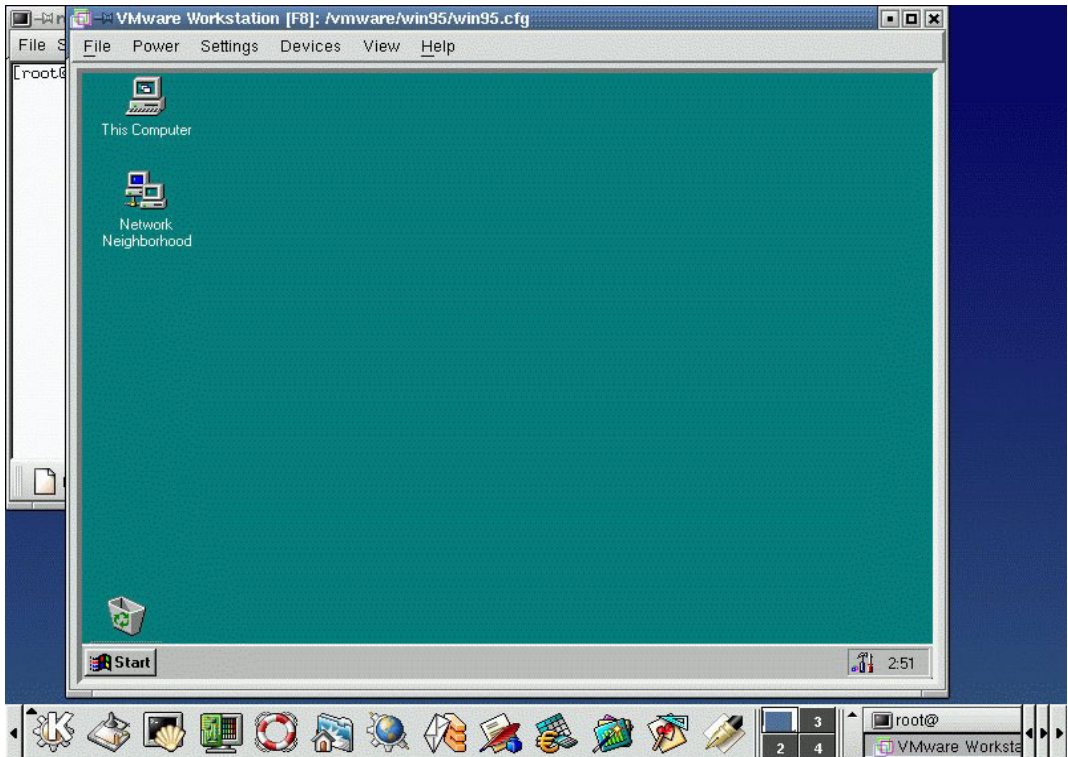
Running Windows programs

- To run a Windows program, the underlying Windows OS needs to be emulated.
- This can be done at two levels.
  - Emulate a PC and install Windows on it.
  - Emulate Windows itself.
- Note that you need a license for Windows if you use any Windows software (including single DLLs).

Emulators and virtual machines

- Emulate a PC on which you install Windows
- Do need a Windows license
- Open source:
  - Bochs (http://bochs.soundforge.net)
  - Xen (http://www.xen.org)
  - KVM (www.linux-kvm.org)
  - Qemu (www.qemu.org)
- Commercial:
  - VMWare (http://www.vmware.com)
  - VirtualBox (http://www.virtualbox.org)

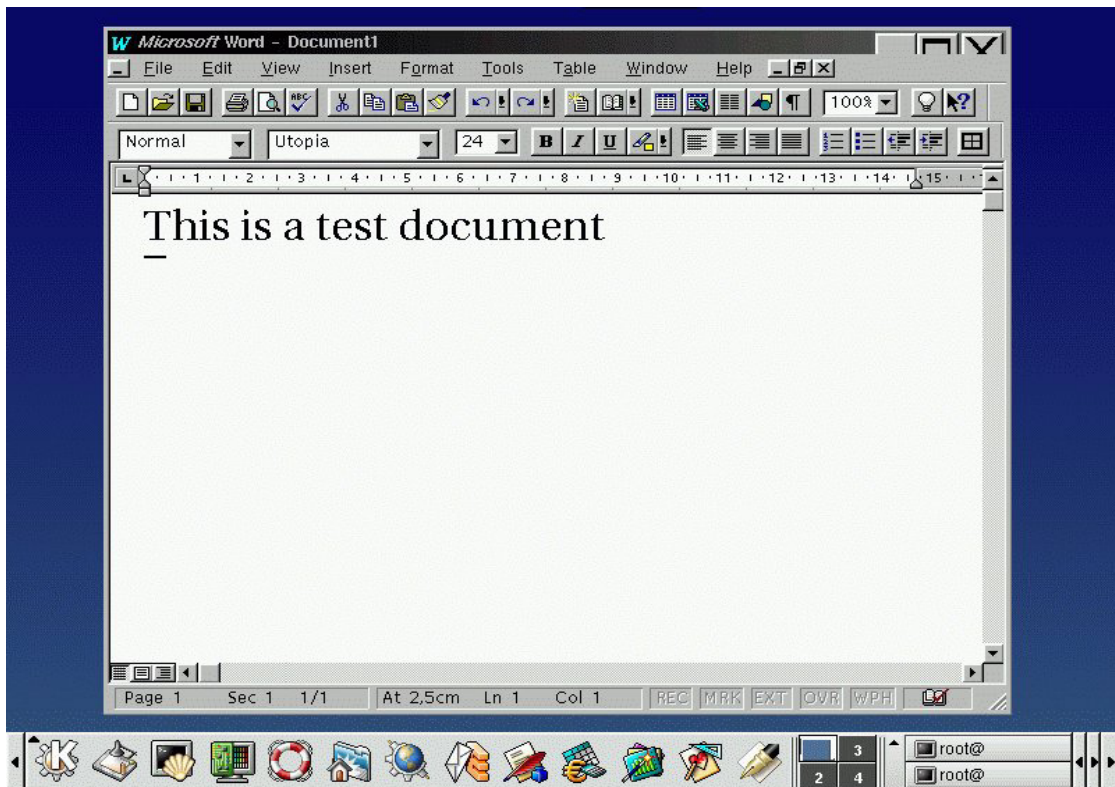# VMWare screenshot

Windows emulators

- WINE (a compatibility layer) (http://www.winehq.com):
  - Open source product
  - Does not need a Windows license if only WINE or third party DLLs are used
  - Can use Windows DLLs (beware of license!)
  - To see if your application is supported, go to Web site
- CrossOver Office (http://www.codeweavers.com):
  - Commercial extension to WINE

WINE screenshot

Accessing Windows servers

- Samba (http://www.samba.org):
  - Open source product
  - Runs on any UNIX
  - Used to replace a Windows server (not covered here)
  - Also includes a number of client tools (smbclient and smbmount)
- smbclient allows you to retrieve information about a Windows server and access files ftp-style.
- smbmount allows you to mount Windows shares over the network.

smbclient examples

```
# smbclient -L winserver -N
# smbclient -L winserver -U user
# smbclient -L winserver -U user%password
# smbclient //winserver/sharename -U user%pw
smb> get file1
smb> put file2
smb> quit
```

- Options
  - **-L:** Lists the shares on the server
  - **-N:** Guest access
  - **-U:** Qualified access

smbmount examples

- To mount a share as a file system:

```
# smbmount //winserver/sharename /mnt/winC
...or
# mount -t smbfs //winserver/sharename /mnt/winC
# mount -t smbfs -o username=tux1 \
> password=secret //winserver/sharename /mnt/winC
```

- Make permanent by adding this to `/etc/fstab`:

```
/dev/hda5                / ext2 defaults                                    1 1
/dev/hda2                /boot ext2 defaults                                1 2
/dev/hda6                swap  swap defaults                                0 0
//winserver/sharename /mnt/winC smbfs defaults,username=user%password       0 0
```

Reading Windows document formats

- Most native office programs for Linux read and save Windows document formats.
  - OpenOffice
  - koffice
  - AbiWord

```
$ file mytext.doc
mytext.doc: Microsoft Office Document
$ swriter mytext.doc
```

- Note that all document features might not be supported.

Other useful programs

- **rdesktop:** Connect to a Windows terminal server
- **VNC:** Allows you to take over a Windows systems screen remotely
- **dos2unix** and **unix2dos:** Convert Windows text files (CR/LF) to UNIX text files (LF)
- **cygwin** (http://www.cygwin.com): Series of Linux tools running under Windows

Unit review

- To access files on Windows file systems, either mount these file systems or use the mtools.

- To run Windows programs, use a PC emulator, such as Bochs or VMWare, or use a Windows emulator, such as WINE.

- CrossOver Office allows you to install Windows programs directly under Linux.

- To access Windows servers, you can use the client programs from the Samba product: smbclient and smbmount.

- To read Windows document formats, you can use almost any native Linux office program: OpenOffice, koffice, AbiWord, and others.

- Several other useful programs exist, including rdesktop.

Checkpoint

1. True or False: To make a mount of a Windows file system permanent, you need to add it to `/etc/fstab`.

2. You want to run a third-party program under Linux that was written to run under Windows. Which solution generally does not require you to have a Windows license?
   a. Bochs
   b. WINE
   c. VMWare
   d. VirtualBox

3. What command allows you to mount a share from a Windows server?

Checkpoint solutions

1. True or False: To make a mount of a Windows file system permanent, you need to add it to `/etc/fstab`.

   The answer is true.

2. You want to run a third-party program under Linux that was written to run under Windows. Which solution generally does not require you to have a Windows license?
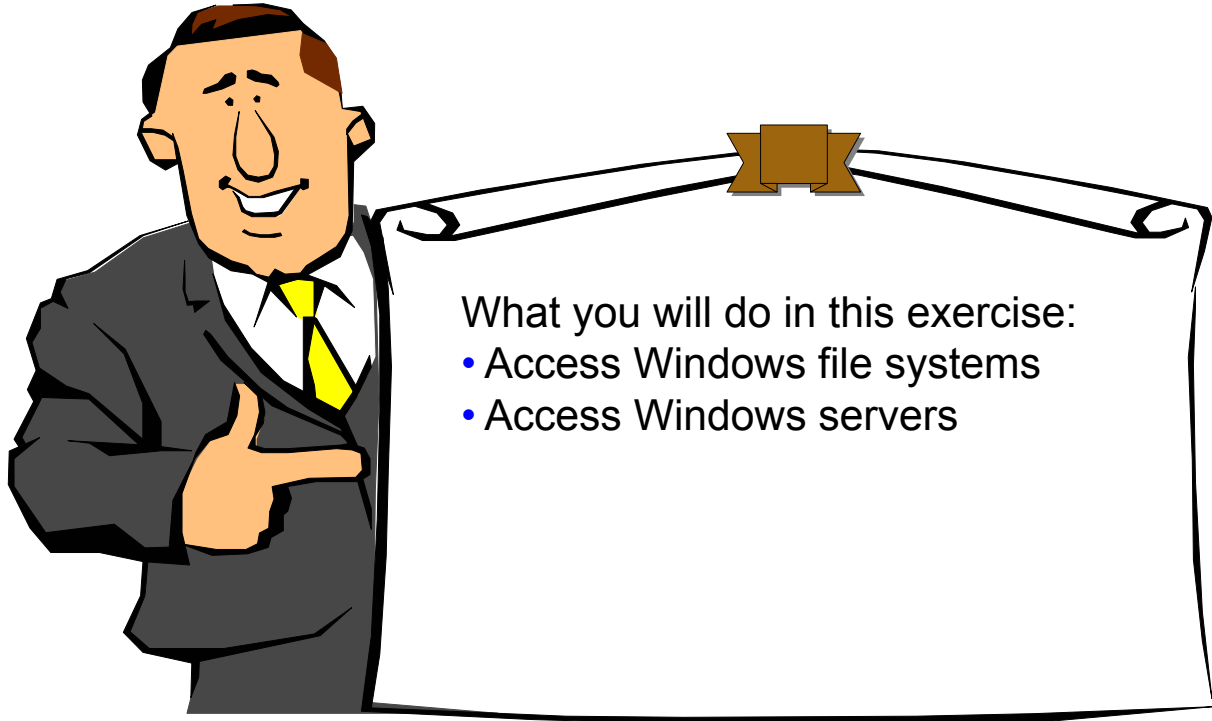
   a. Bochs
   b. WINE
   c. VMWare
   d. VirtualBox

   The answer is WINE.

3. What command allows you to mount a share from a Windows server?

   The answer is **smbmount**.

Exercise: Integrating Linux in a Windows environment

What you will do in this exercise:
- Access Windows file systems
- Access Windows servers

Unit summary

Having completed this unit, you should be able to:

- Access Windows-based file systems
- Run Windows programs
- Access Windows servers
- Read Windows document formats