THE UNIVERSITY COLLEGE
OF THE CARIBOO

COMPUTING 253

Small Computer Systems: Organisation and Architecture

Workshop #6 – Multiple Operating Systems

No Submission Required

Introduction

Most computer systems, whether personal or professional, have a single operating system (OS) installed, and most often one is sufficient. Yet for situations focused on system development, configuration testing, and having multiple available platforms (OSes + applications), it becomes expensive to have a unique, separate computer system for each. In these cases, there are two options,

- an "emulation" method that enables another environment/OS to exist as a concurrent sub-system, using tools such as VMWare or VirtualPC; these are expensive and require powerful computers with large resources (RAM, disks);

or

- pre-load multiple OSes and configure the system to load a specific OS at boot time; this is simpler, although only allowing one OS to run at a time.

This tutorial presents an example of the second option, describing how to install Microsoft Windows along with a distribution of Linux.

References

The concepts and instructions from the previous tutorial are required, in which a hard disk was prepared (partitioned/formatted) and Windows was installed.

Further, many resources are available that describe techniques, advantages, and opinions on multi-boot configurations. It seems as though there are as many methods as people that describe them. The following are good starting points,

- Multi-Booting Linux and Windows: http://home.houston.rr.com/move2lin/multiboot.htm
- BlackViper's Multiple OS Installation Guide: http://www.blackviper.com/Articles/OS/Multiboot/multiboot1.htm
- RedHat Install Guide: http://www.nextl3vel.net/redhat_guide

Exercises

The instructions below follow a popular and standard sequence of configuring the drive for a basic installation of Windows; followed by the Linux installation. This order is important because the desired *multi-operating system loader* is provided during the Linux installation (the loader also recognises the Win OS).

Conclusion

After completing the installation of the operating systems, reflect on what was accomplished: the installation of two unique operating systems on one hard drive. This is a major accomplishment for any computer professional—be proud of yourself.

Tasks

A. Configuring the experimental and installing Windows

1. Use the same steps as in the previous tutorial to physically connect an experimental hard disk to a workstation computer.
   Make sure the existing hard disk is disconnected from both data and power.
2. Boot the system with the DOS System Boot disk.
   Before creating any partitions, it maybe necessary to remove any special settings in the *master boot record* of the disk drive, type: **fdisk /mbr**
3. Prepare the hard disk's partition table with the following structure:
   Primary: 500 MB (C:), Extended: all remaining space, Logical: 200 MB (D:)
   Note: The Extended partition is given all the remaining space to allow for Linux to create its necessary Logical partitions.
4. Format the two drives (C:, D:) appropriately then use the technique of installing Windows by copying it to the hard drive (*see previous tutorial*).
   Note: Do not worry about creating config.sys *and* autoexec.bat *on C:, just use the fact that the DOS System Boot disk already loads the CD-ROM driver.*
5. Continue with the Windows installation until it is running without requiring any restarts (don't worry about updates or special device drivers).

B. Installing Linux – RedHat Linux 9.0

1. Reboot the computer, and place RedHat 9.0 CD 1 in the CD-ROM drive.
   This CD is bootable, but enter the BIOS to ensure that the CD-ROM drive (ATAPI device) is the first boot device in the BIOS.
2. As soon as the **boot:** prompt is displayed, type: **expert**
   This ensures that all the installation options and controls to be displayed.
3. Follow the instructions on the screen, using the following options unless otherwise stated in the following steps,
   - there are no special drivers disks
   - a new installation is being performed
   - a workstation or personal desktop installation is being performed
   - ignore the network configuration (take the defaults); or use the similar settings from *Workshop #3 – UNIX/Linux*
   - set the root (administrator) password as: **zither**
4. When asked about partitioning the hard disk, choose to use manual with Disk Druid (other options may remove the existing Windows partitions).
5. To add the Linux partitions, do not change the existing partitions.
   In the Extended partition, add two new partitions,
   - root: mount point: **/** (root), file system type: **ext2fs**, and size: 3 GB
   - swap: no mount point, file system type: **swap**, and size: 1 GB
6. When the screen is presented for the **BOOT LOADER**, there are two available: LILO (Linux Loader), GRUB (GRand Unified Bootloader)
   - **select LILO**
   - by default, both loaders automatically find and install the Windows environment as a boot option, with Linux being the default boot
   - select the Windows partition to be the default boot option.
7. When asked about the packages to install, take the defaults.

8. When asked to create the emergency repair/boot disk, ignore this option.
   Although, for a real installation, this diskette is an absolute necessity!

C. Testing the multi-boot configuration

1. After Linux completes the installation, and the system restarts, the loader will show both operating systems. At this point the user can select which to load before the default OS is automatically selected.
2. Test both operating systems: can you boot into both (although not at the same time)? Check.
   (if the Linux GUI was not set as the default during install type: **startx**)

D. Finishing up

1. There is not enough time to fully examine the Linux installation, but it is very similar to the previous UNIX/Linux tutorial guide using Knoppix.
2. To erase the hard disk, use Partition Manager to delete all partitions.
3. Remove the experimental drive and set the system to the original configuration, reattaching the original hard disk.

NOTES:

Take a moment and prepare a description of the partition table created during the lab, indicating *primary*, *extended*, and *logical partitions*.

Identify the operating systems that used each partition, along with the file system type for each partition.