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MODULE 02

Installation

Objectives

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- Identify the type of system, hardware, and network settings necessary for Linux installation
- Describe the need for pre-installation procedures
- Identify the different types of file systems: ext2fs, ext3fs, ReiserFS, XFS, and JFS
- Describe the procedures for CD-ROM or network installation
- List and describe the different types of boot loaders
- List and describe system initialization, boot sequences, and boot files

Installation Options

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- There are several ways to install Linux
  - From CD-ROM
  - Over a network
  - From a volume on a network server
  - Shared CD-ROM on a remote machine
  - Off the internet using ftp or http
- There are no restrictions on sharing or copying installation CD-ROMs

Getting Ready

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- When you are preparing for installation, you need to consider
  - Type of Linux system
  - Hardware configuration
  - Network settings

Determine Your Hardware

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- Many distributions will automatically detect your hardware
- You may need to know specifics of the following:
  - PCMCIA
  - CD-ROM
  - Harddrive(s)
  - Laptop issues
  - Memory
  - NIC
  - Modem
  - Mouse
  - SCSI adaptor

Determine Network Settings

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- If you are connecting to a network and not using DHCP you will need to know
  - IP address
  - Netmask
  - Gateway IP address
  - Nameserver IP addresses
  - Domain name
  - Hostname

General Installation Steps

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- Distributions have various installation methods
- General steps include
  - Install or Upgrade
  - Many installations have you choose between an installation or an upgrade
  - Disk Partitioning
    - This will allow you to create new partitions out of free space, or to use existing Linux partitions
    - Swap Space
    - Allocate usable swap space.
    - File Systems
    - Define which file system to use
    - Partition the drive
  - Hardware and software configuration

Disk Partitioning

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- Disk partitioning is the method in which a hard drive can be divided into separate sections.
- Three types of partitions: primary, extended and logical
- There can only be 4 primary partitions per drive
- An extended partition acts as a container for logical partitions
- The partition which contains /boot will need to be below the 1024 cylinder of the drive on older machines

Swap Space

- The swap partition is a space on the hard drive
  - Linux uses swap for virtual memory
  - Linux pages unused memory sections out to disk
- Running Linux without swap will affect performance
- A swap partition is type 82 under fdisk
- You use multiple swap partitions

File System Types

- Linux supports dozens of file systems. Below are the most prominent:
  - ext2fs: first implemented in the 2.2 kernel; no journaling support
  - ext3fs: a more robust version of ext2fs; supports journaling
  - ReiserFS: utilizes a “balanced tree” archatecture; supports journaling
  - XFS: developed by SGI for their 64-bit processors; supports file sizes up to 8129 petabytes
  - JFS: journaling file system developed by IBM

Partition the Drive - fdisk

- The standard utility used to partition a hard drive in preparation for a Linux install is fdisk
- Simple program with a minimal set of commands
- Must first plan your partition scheme
- Number of partitions
- What they will be used for
- Space required for each partition

Drive and Partition Names

- Devices under Linux are numbered sequentially
- IDE devices are named
  - /dev/hda, /dev/hdb, etc.
- Logical partitions on /dev/hda
  - /dev/hda1, /dev/hda2, etc.
- SCSI devices are named
  - /dev/sda, /dev/sdb, etc.
- Logical partitions on /dev/sda
  - /dev/sda1, /dev/sda2, etc.

Installation

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- CD-ROM
  - Be sure to create a boot floppy if your system cannot boot from CD-ROM
- Network
  - Ftp server
  - NFS server
  - **HTTP server**

Linux Boot Loaders

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- Boot loaders include:
  - LILO
  - GRUB
  - LOADLIN
  - Choose-OS
  - System Commander
  - SYSLINUX
- Most Intel-based systems use LILO
- Some may default to GRUB

LILO

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- Nearly every Linux distribution configures LILO during the installation process
- The configuration file for LILO is /etc/lilo.conf
- You can find more information about LILO in the files
  - /usr/doc/lilo-*/doc/Technical_Guide.ps
  - /usr/doc/lilo-*/doc/User_Guide.ps
- Or in these documents available from The Linux Documentation Project
  - BootPrompt-HOWTO
  - Bootdisk-HOWTO
  - Installation-HOWTO
  - Kernel-HOWTO

GRUB

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- In addition, through chain loading, GRUB can load proprietary operating systems as well
- GNU GRUB can load a variety of free operating systems (Linux, FreeBSD, etc.)

System Initialization

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- After the system has been installed and the computer has been rebooted, you will get the following prompt:

  LILO boot:

- This is the prompt that allows you to boot multiple operating systems
- The Tab key will show you a list of the images that LILO can boot
- The Enter key will boot the default image

Linux Boot Sequence

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- 1. BIOS/POST
- 2. MBR (LILO or GRUB)
- 3. Kernel + initd
- 4. /linuxrc on initrd (optional)
- 5. mount root file system
- 6. find and execute /sbin/init (or execute init=program)
- 7. inittab
- 8. /etc/rc scritps
  - rc.sysinit (Red Hat)
  - the rc script
- 9. getty & display manager (xdm, kdm, gdm, etc.)

Summary

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