

Linux – Introduction/Installation

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Linux as an Operating System

- Akin to DOS, NT, Unix, MacOS
- Underlying control of computer
- Coordinates operation of components
- Analogous to human nervous system

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Linux origins

- Linus Torvalds originated kernel
- Contributing “team” gathered on internet
- Non-commercial, GNU license
- Several “distributions” evolved
 - Slackware
 - RedHat/Fedora
 - Debian
 - Mandriva
 - SuSe
 - Gentoo

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Basic commands

- Original command line interface
- “Man”ual pages = online help
- GUI interface thru X Window system
- Command interaction needed for installation etc.
- Some common commands:
 - ls -list files (dir)
 - rm – remove (del)
 - cd –change directory (cd)
 - mkdir - make directory (md)
 - cp – copy (copy)
 - vi - text editor (edit)

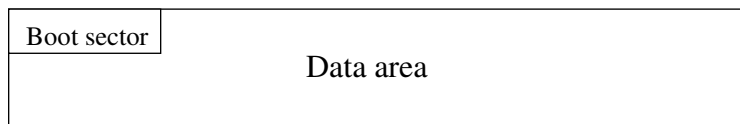
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Partitions

- What they are
- Hard drive has them
- Up to 4 primary
- Extended/logical (to break limit of 4)
- MBR – contains partition table

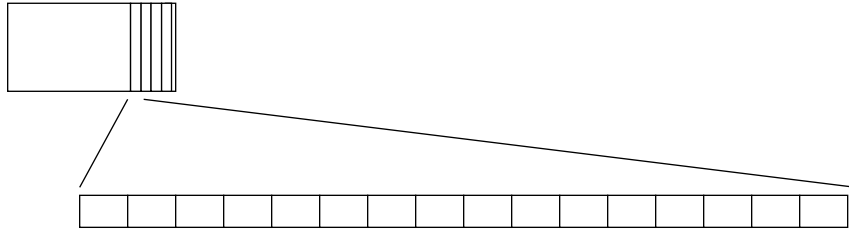
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Diskette Layout



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Partition Table Record



Active	Start H/SC	Type	End H/SC	Partition start (sector)	Partition size (sectors)
80H					
00H					

http://www.win.tue.nl/~aeb/partitions/partition_tables.html

<http://www.edm2.com/0603/drive.html>

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Example – a disk's 3rd partition

80	00	81	95	83	3f	ff	e4	c0	aa	28	00	00	ac	14	00
----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Active	Start H/SC	Type	End H/SC	Partition start (sector)	Partition size (sectors)
80H					
00H					

output of "fdisk -l" command:

Disk /dev/hda: 64 heads, 63 sectors, 1023 cylinders
Units = sectors of 1 * 512 bytes

Device	Boot	Start	End	Blocks	Id	System
/dev/hda1		63	1641023	820480+	c	Win95 FAT32 (LBA)
/dev/hda2		1641024	2665151	512064	7	HPFS/NTFS
/dev/hda3	*	2665152	4019903	677376	83	Linux
/dev/hda4		4019904	4124735	52416	82	Linux swap

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PC Booting sequence

- BIOS's code
- MBR's code
- Then what?
 - MBR's code passes control downstream
 - “where to” depends entirely on MBR's code
- If “standard/dos” MBR
 - To boot sector of partition marked active in table
- If lilo or GRUB
 - to known code at a predetermined disk location

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Multiple drives

- Can have many hard drives
- Each follows this partition scheme

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Referring to partitions

- MS uses letters like C:
- Linux does not

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Linux partition nomenclature

- “device names” are used
- hda vs. hdb
 - differentiate drives (eg primary master vs primary slave)
- hda vs. sda
 - differentiate drive types (eg ide vs scsi)
- hda vs. hda1 hda2 etc
 - differentiate drives from their partitions
- hda1-4 vs. hda5-8
 - differentiate primary/extended partitions from logical ones

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Partitioning for Installation

- Linux requires at least 1 partition
- A second partition for “swap” is beneficial
- May utilize several partitions
 - each with its own “filesystem”
 - each “filesystem” holds part of the tree
 - glued together by “mount” at boot/run time

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Installation requirements

- An available existing partition, or
- Empty space from which to create one
 - large enough
 - allowable within partition rules (4 max)

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Partition(s) receive file system

- file system has physical type
- file system has logical directory hierarchy
- both are called “file system”
- ...as are disks/partitions containing hierarchy

gotcha!
ambiguous
term

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“File system” types

- FAT DOS
- FAT32 Windows 98
- HPFS OS/2
- NTFS Windows NT
- ext2/ext3 Linux
- iso9660 CD-ROM

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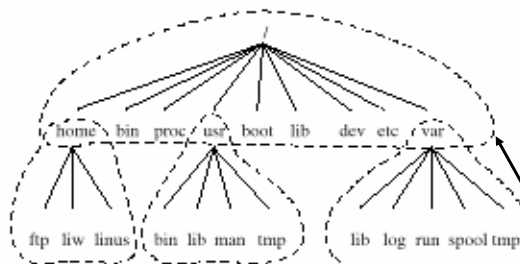
Reading file system types

- Linux can read its own file system type
 - ext2
- Linux can read other types of file systems
 - FAT
 - FAT32
 - iso9660
 - NTFS

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“File system” hierarchy

- A tree structure of directories
- The directory tree is standardized



- But varies slightly among distributions

portions can spread
across
different partitions

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Mounting file systems

- Grafting “subdirectories” onto file tree
- Integrates different devices’ subtrees into a single hierarchy
- Grafting location in tree called “mount point”
- Examples
 - transient mount of diskette drive to access floppy
 - mount a new hard drive to incorporate its capacity
- `/etc/fstab` for mount persistency

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Sourcing Linux during install

- Local sources
 - From DVD/CDs
 - From hard disk
- Network sources
 - ftp
 - http
 - nfs

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Installation steps

- Small linux system loads to memory
- Installation program runs (RedHat)
 - Asks for source media
 - Preps target partition
 - Asks “packages” to install
 - Makes HD bootable
 - Identifies hardware

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Next step

You will install Linux!

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Where to Get More Information

-- on your computer

- Man pages
- “documentation” subdirectories

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Where to Get More Information

-- on the internet

- The Linux Documentation Project (www.tldp.org)
 - HOWTOs
 - Linux Installation HOWTO
 - Linux Partition HOWTO
 - Filesystems HOWTO
 - Guides
 - The Linux System Administrators' Guide
 - Linux Filesystem Hierarchy
- Distributions' documentation
 - <http://fedoraproject.org/>

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Where to Get More Information

-- on the internet

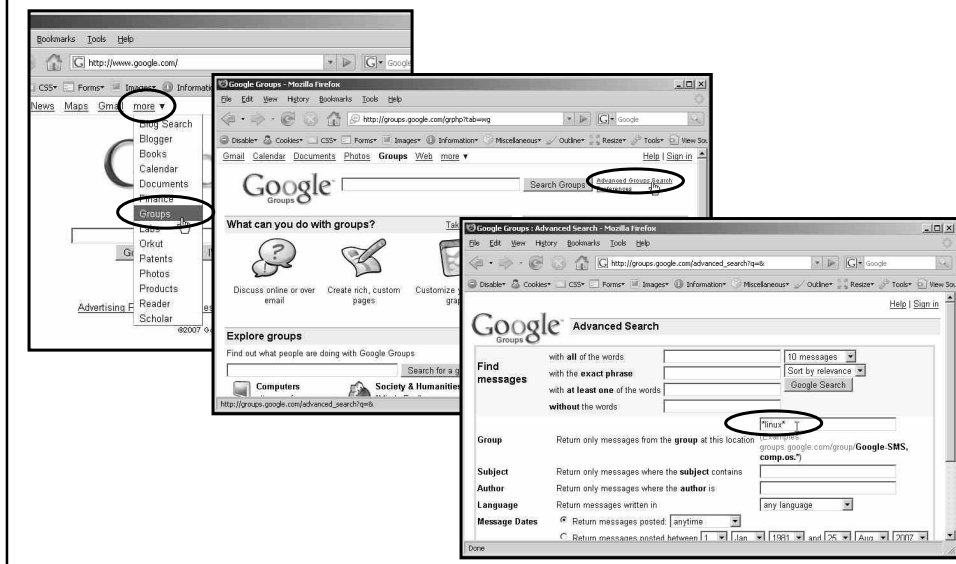
- Usenet newsgroups

- comp.os.linux.answers, FAQs, HOWTOs, READMEs, etc.
- comp.os.linux.hardware, hardware compatibility
- comp.os.linux.networking, networking, communications
- comp.os.linux.setup, installation and system administration.
- comp.os.linux.x, X Window System servers, clients, libs and fonts.

- Newsgroup archives – de facto tech support
see next slide

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Where to Get More Information



Where to Get More Information

-- other sources

- Linux Journal <http://www.linuxjournal.com/>
- Selected books
 - A Practical Guide to Linux, Sobell, Addison-Wesley 1997
 - Practical Guide to Red Hat Linux: Fedora Core and Red Hat Enterprise Linux, Sobell, Prentice-Hall 2006
 - Linux Administration Handbook, Nemeth, Snyder & Hein, Prentice Hall 2007
 - Fedora 7 and Red Hat Enterprise Linux Bible, Christopher Negus, Wiley 2007

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