

– LPI 101 –

Design Hard Disk Layout [2]

(Linux Professional Institute Certification)

a

```
.~.  
/V\   by: geoffrey robertson  
//  \\\      geoffrey@zip.com.au  
@. _ .@
```

\$Id: gl1.102.1.slides.tex,v 1.2 2003/05/30 05:00:47 waratah Exp \$

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Design hard disk layout [2]

Objective

Candidates should be able to design a disk partitioning scheme for a Linux system. This objective includes allocating filesystems or swap space to separate partitions or disks, and tailoring the design to the intended use of the system. It also includes placing `/boot` on a partition that conforms with the BIOS' requirements for booting.

Design hard disk layout [2]

Key files, terms, and utilities

/ (root) filesystem

/var filesystem

/home filesystem

swap space

mount points

partitions

cylinder 1024

Resources of interest

Linux Partitioning Mini-FAQ

<http://pw1.netcom.com/~kmsself/Linux/FAQs/partition.html>

IA32 Disk Partitions

Primary Partitions

On i386 systems disks may be sliced up into to 15 partitions.

(It may be possible to have 63 or more partitions in IDE disk drives)

- The disk must have at least 1 primary partition.

`/dev/hda1`

- There may be up to 4 primary partitions.

`/dev/hda1` (primary)

`/dev/hda2` (primary)

`/dev/hda3` (primary)

`/dev/hda4` (primary)

IA32 Disk Partitions

Logical Partitions

On i386 systems disks may be sliced up into to 15 partitions.

- One of the 4 primary partitions may be made into an extended partition.
- The one extended partition must hold between 1 and 12 logical partitions.

```
/dev/hda1  (primary)
/dev/hda2  (extended)
/dev/hda5  (logical)
/dev/hda6  (logical)
...
/dev/hda16 (logical)
```

Linux Partitioning mini-FAQ

Basic Recommendation

/	50 - 100 MB
/tmp	50 - 100 MB
/var	200 - 500 MB
/usr	1 - 2+ GB
/usr/local	1 - 2+ GB
/home	remainder

Linux Partitioning mini-FAQ

Swap

- Linux currently has a maximum of 2GB

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- Traditional recommendation is 2x physical RAM
- Karsten M. Self uses 3x physical RAM
- Large amounts of swap should be divided across several partitions and preferably across several spindles.

Linux Partitioning mini-FAQ

Root partition

The root partition must have:

- /bin
- /dev
- /etc
- /initrd
- /lib
- /root
- /sbin

Other directory trees may be distributed on other partitions/spindles.

Linux Partitioning mini-FAQ

Directories on separate partitions

/tmp highly variable. Don't risk your root partition, isolate this content.
Mount noexec and/or nosuid for added protection.

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/usr/local Largely stable, and not part of the packaging system. Can be mounted read-only, possibly nosuid.

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- /var** likewise, highly variable. Mount noexec and/or nosuid for added protection.
- /usr** Largely stable. Can be mounted read-only except for package upgrades.
- /usr/local** Largely stable, and not part of the packaging system. Can be mounted read-only, possibly nosuid.
- /home** Variable content, usually most sensitive data both in terms of security and integrity. Can be mounted nosuid.

Linux Partitioning mini-FAQ

Typical Desktop

Filesystem	1k-blocks	Used	Available	Use%	Mounted on
/dev/hda3	152247	33526	110859	24%	/
/dev/hda6	249871	2004	234967	1%	/tmp
/dev/sda7	585008	457456	97836	83%	/var
/dev/hda5	495960	87588	382772	19%	/var/spool/news
/dev/sdb2	1929100	1518288	312816	83%	/usr
/dev/sda5	1209572	574152	573976	51%	/usr/local
/dev/hda7	378711	213496	145662	60%	/usr/local/data
/dev/hda2	1007992	584132	372656	62%	/home
/dev/hda1	157044	119252	37792	76%	/mnt/dos

Linux Partitioning mini-FAQ

Typical Desktop fdisk /dev/hda

Disk /dev/hda: 128 heads, 63 sectors, 620 cylinders
Units = cylinders of 8064 * 512 bytes

Device	Boot	Start	End	Blocks	Id	System
/dev/hda1		1	39	157216+	6	FAT16
/dev/hda2		40	293	1024128	83	Linux
/dev/hda3	*	294	332	157248	83	Linux
/dev/hda4		333	620	1161216	5	Extended
/dev/hda5		333	459	512032+	83	Linux
/dev/hda6		460	523	258016+	83	Linux
/dev/hda7		524	620	391072+	83	Linux

Linux Partitioning mini-FAQ

Typical Desktop `fdisk /dev/sda`

Disk /dev/sda: 255 heads, 63 sectors, 261 cylinders
Units = cylinders of 16065 * 512 bytes

Device	Boot	Start	End	Blocks	Id	System
/dev/sda1		1	17	136521	82	Linux swap
/dev/sda2		18	261	1959930	5	Extended
/dev/sda5		18	170	1228941	83	Linux
/dev/sda6		171	187	136521	82	Linux swap
/dev/sda7		188	261	594373+	83	Linux

Linux Partitioning mini-FAQ

Typical Desktop `fdisk /dev/sdb`

Disk /dev/sdb: 255 heads, 63 sectors, 261 cylinders

Units = cylinders of 16065 * 512 bytes

Device	Boot	Start	End	Blocks	Id	System
/dev/sdb1		1	17	136521	82	Linux swap
/dev/sdb2		18	261	1959930	83	Linux

Linux Partitioning mini-FAQ

Typical Desktop /etc/fstab

```
/dev/hda3      /                ext2 defaults,errors=remount-ro      0 1
proc           /proc           proc defaults                          0 0
/dev/hda6      /tmp            ext2 defaults,nosuid,nodev          0 2
/dev/sda7      /var            ext2 defaults,nosuid,nodev          0 2
/dev/hda5      /var/spool/news ext2 defaults,nosuid,noexec,nodev    0 2
/dev/sdb2      /usr            ext2 defaults,rw,nodev              0 2
/dev/sda5      /usr/local      ext2 defaults,rw,nosuid,nodev       0 2
/dev/hda7      /usr/local/data ext2 defaults,nosuid,nodev          2 2
/dev/hda2      /home           ext2 defaults,nosuid,nodev          0 2

/dev/hdc       /mnt/cdrom      iso9660 noauto,user,ro,nodev,nosuid        2 2
/dev/fd0       /mnt/floppy     auto noauto,gid=disk,umask=007,rw,user 2 2
/dev/hda1      /mnt/dos        vfat auto,user,nosuid,nodev,gid=6,umask=002 2 2

/dev/sda1      none            swap    sw                0      0
/dev/sdb1      none            swap    sw                0      0
/dev/sda6      none            swap    sw                0      0
```

The End