

– General Linux 2 –

Design Hard Disk Layout [2]

(Linux Professional Institute Certification)

a

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

\$Id: gl2.102.1.slides.tex,v 1.4 2003/05/30 06:03:32 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.

- 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.

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.
- /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	lk-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