– 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 $

List of Slides

(2.2) 102 Installation & Package Mgt. [24]

2.102.1 **Design hard disk layout [2]**

2.102.2 Install a boot manager [3]

2.102.3 Make and install programs from source [5]

2.102.4 Manage shared libraries [3]

2.102.5 Use Debian package management [5]

2.102.6 Use Red Hat Package Manager (RPM) [6]

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/~kmself/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)
```

Typical Desktop `/etc/fstab`

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

Linux Partitioning mini-FAQ

Swap

- Linux currently has a maximum of 2GB
- VA Linux configures its servers with 1x physical RAM

Linux Partitioning mini-FAQ

Swap

- Linux currently has a maximum of 2GB
- VA Linux configures its servers with 1x physical RAM
- Traditional recommendation is 2x physical RAM

Linux Partitioning mini-FAQ

Swap

- Linux currently has a maximum of 2GB
- VA Linux configures its servers with 1x physical RAM
- Traditional recommendation is 2x physical RAM
- Karsten M. Self uses 3x physical RAM

Linux Partitioning mini-FAQ

Swap

- Linux currently has a maximum of 2GB
- VA Linux configures its servers with 1x physical RAM
- 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.

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.

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.

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.

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 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