

LPIC-1 101-500 – Lesson 13

102.2 Install a boot manager



Boot Loaders

- Boot loader come in two or three stages: **stage1**, **stage1.5** (optional) and **stage2**
- **stage1** lies on **MBR** and it is loaded by BIOS. It is small enough to fit MBR.
- **stage1.5** is optional and contains modules needed for bootup/
- **stage2** is on disk under /boot/grub (or /boot/grub2) and it is responsible for loading the kernel
- Boot loaders vary depending on system architecture. For x86 and x86_64 systems we have **LILO** (obsolete), legacy **GRUB** and **GRUB2**



Legacy *GRUB* and *GRUB2*

- **GRUB** was engineered to overcome the weaknesses of older boot loaders like LILO
- Unlike LILO it can read files (configuration kernels, initrds) from the filesystem (ext3, fat, ntfs etc)
- Changes in the configuration file are applied instantly
- Allows temporary configuration changes on startup
- It has its own CLI shell which is a great help in case of system recovery
- It can be loaded on the MBR or the boot sector of a partition



Device Naming Convention for Legacy *GRUB*

- **(fd0)** # floppy disk drive (/dev/fd0)
 - **(hd0)** # the first disk (/dev/hda, /dev/sda or /dev/vda)
 - **(hd0,0)** # first partition on first disk (/dev/sda1, etc)
 - **(hd0,4)** # first logical partition on first disk (/dev/sda5)
 - **(hd1)** # second disk (/dev/sdb)
 - **(hd1,0)** # first partition on second disk (/dev/sdb1)
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Device Naming Convention for *GRUB2*

- **(fd0)** # floppy disk drive (/dev/fd0)
 - **(hd0)** # the first disk (/dev/hda, /dev/sda or /dev/vda)
 - **(hd0,msdos0)** # first partition on first disk (/dev/sda1, etc)
 - **(hd0,msdos4)** # first logical partition on first disk (/dev/sda5)
 - **(hd1)** # second disk (/dev/sdb)
 - **(hd1,msdos0)** # first partition on second disk (/dev/sdb1)
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Legacy *GRUB* files

- All files for the proper operation of Legacy **GRUB** are under **/boot/grub/**
- **/boot/grub/device.map** # detected devices
- **/boot/grub/stage[12]** # stages 1 and 2
- **/boot/grub/*1_5** # various modules for filesystems (stage 1.5)
- **/boot/grub/menu.lst** # configuration file for **GRUB**.



GRUB2 files

- All files for the proper operation of **GRUB2** are under **/boot/grub/** (or **/boot/grub2**)
- **/boot/grub/grub.cfg** # configuration file for **GRUB2**.
- **/etc/default/grub** # helper configuration file.
update-grub must be executed after changes into this file



The */boot/grub/menu.lst* configuration file (Legacy GRUB)

```
default=0          # set default menu entry
timeout=5          # wait for 5 seconds before booting the default
entry
splashimage=(hd0,0)/grub/splash.xpm.gz    # set startup theme
hiddenmenu        # hide menu (Press <Tab> to unhide)
title CentOS (2.6.18-274.3.1.el5) # title of menuentry
    root (hd0,0) # partition where the /boot/grub/ directory exists
    kernel /vmlinuz-2.6.18-274.3.1.el5 ro root=LABEL=/ # kernel
    initrd /initrd-2.6.18-274.3.1.el5.img # Ramdisk
title CentOS (2.6.18-238.el5) # older menuentry
    root (hd0,0)
    kernel /vmlinuz-2.6.18-238.el5 ro root=LABEL=/
    initrd /initrd-2.6.18-238.el5.img
```



The */etc/default/grub* configuration file (*GRUB2*)

```
GRUB_DEFAULT=0 # Default menuentry
GRUB_TIMEOUT=2 # Timeout before booting default menuentry
GRUB_CMDLINE_LINUX_DEFAULT="" # kernel parameters for
                                # normal (non-recovery)
                                # menuentries
GRUB_CMDLINE_LINUX="" # kernel parameters for all kernels
```

*Note: Remember to run `update-grub` after changes to the */etc/default/file**



Install Legacy *GRUB*

- # `grub-install '(hd0)'` # = **grub-install /dev/sda**. Install GRUB on the Master Boot Record (MBR) of the first disk
- # Install **GRUB** from its own CLI:
 <Tab> # Show menu
 c # enter the GRUB CLI
 grub> root (hd0,0) # set the partition for
 # the creation of the
 # **grub** directory
 grub> setup (hd0) # write GRUB in MBR

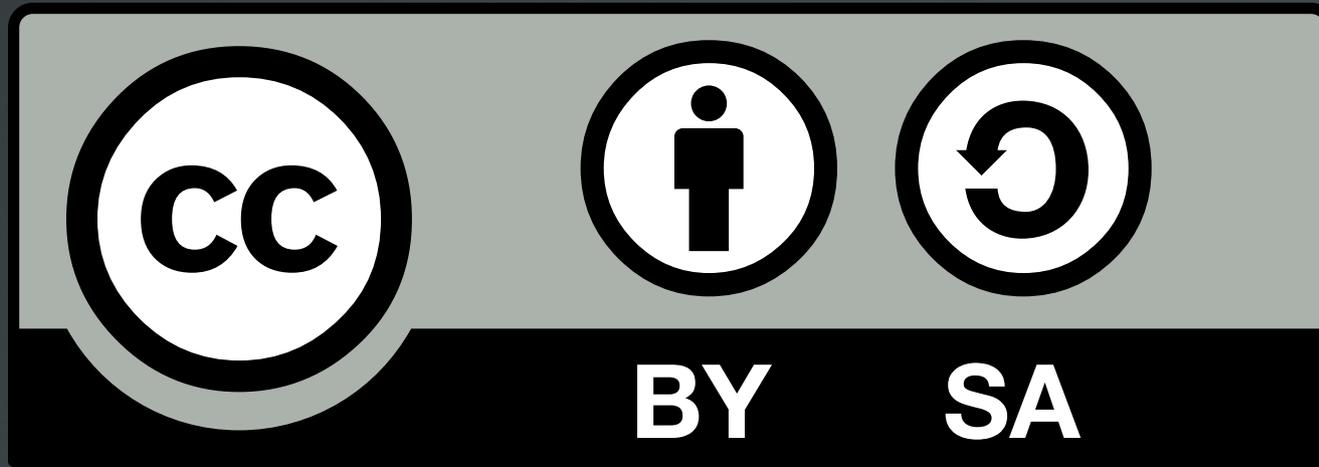


Install *GRUB2*

- # `grub-install '(hd0)'` # = `grub-install /dev/sda`. Install GRUB2 on the Master Boot Record (MBR) of the first disk
- Use a live/recovery CD to reinstall it using the command above



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