

Troubleshoot Linux boot problems with GRUB

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GRUB (Grand Unified Bootloader) is a boot program that allows users to install multiple distributions on the system and select a copy when the system starts up. GRUB is used on Unix-like systems. The GNU operating system and most distributions use GRUB as a bootloader. GRUB provides a bash-style command line interface that is easy to use.

Linux needs GRUB to boot, but you may encounter an error with GRUB preventing the boot process. You can identify the problem because you will then see the following signs appear:

1. *GRUB has been completely deleted and you will see nothing except a blinking cursor when the server starts.*
2. *GRUB will generate a specific GRUB error message.*
3. *GRUB said it could not find a required file.*

If you encounter problems with GRUB, there are two methods you can apply to fix them. You can reinstall GRUB or restart the system manually by entering GRUB in the command line. We will then reinstall GRUB and then download GRUB manually if we encounter a GRUB error.

Reinstall GRUB

If a serious error with the MBR is encountered on the system, it occurs in the case of a cursor blinking at the start of the machine. When an error occurs with the MBR you will not see the GRUB error message. Usually in that situation you will not be able to boot the system, it is best to use the rescue CD to boot the system. You can use Knoppix to boot.

After booting with the rescue disk, go to the chroot environment and use the `grub-install` command to reinstall GRUB. If you want to install GRUB in the MBR and the hard drive is addressed by the device file `/dev/sda`, you will have to use the command **`grub-install /dev/sda`**. This command will read the GRUB configuration file (located at `/boot/grub/menu.lst` on most distributions) and based on that to write a new GRUB bootloader to the MBR. Below is the information displayed when using **`grub-install`** to reinstall GRUB.

```
root @ Knoppix: /# grub-install /dev/sda
```

```
You should not call /sbin/grub-install. Please call /usr/sbin/grub-install instead!
```

```
Tìm ki?m cho GRUB directory installation . tìm th?y: /boot/grub
```

```
Installation finished. No error reported.
```

Đây là nội dung của file `map /boot/grub/device.map`.

Hãy kiểm tra nội dung này là đúng hay không. Nếu bất kỳ các dòng không đúng,

fix it and re-run the script ``grub-install``.

`(hd0) / dev / sda`

Manually start with GRUB

You do not need to reinstall GRUB. If the GRUB code still exists but because of an error in GRUB's configuration file the system cannot boot, then you can try to boot manually. This is the most suitable method if GRUB displays an error message and then stops the boot process. When manually entering all GRUB commands, you can see exactly where the error occurred to help troubleshoot. Follow these steps to manually download the GRUB configuration.

1. To enter the GRUB boot menu you need to check the system behavior carefully at startup. In most cases, it requires you to press the **Escape** key (ESC) when GRUB is processed. You will then switch to the GRUB command line. Alternatively, you can boot from a rescue CD and enter the GRUB command to open GRUB's command line interface.

```
[ Minimal BASH-like line editing is supported. For
the first word, TAB lists possible command
completions. Anywhere else TAB lists the possible
completions of a device/filename. ESC at any time
exits. ]

grub> _
```

2. **GRUBShell** provides some support for users so you don't need to remember the commands correctly. To see all GRUB commands you just need to use the help command.

```

grub> help
background RRGGBB                blocklist FILE
boot                               border RRGGBB
cat FILE                          chainloader [--force] FILE
clear                              color NORMAL (HIGHLIGHT)
configfile FILE                   displayapm
displaymem                        find FILENAME
foreground RRGGBB                 geometry DRIVE [CYLINDER HEAD SECTOR (
halt [--no-apm]                   help [--all] [PATTERN ...]
hide PARTITION                    initrd FILE [ARG ...]
kernel [--no-mem-option] [--type=TYPE] makeactive
map TO_DRIVE FROM_DRIVE           md5crypt
module FILE [ARG ...]             modulenounzip FILE [ARG ...]
pager (FLAG)                       partnew PART TYPE START LEN
parttype PART TYPE                quietboot
reboot                             root [DEVICE [HDBIAS]]
rootnoverify [DEVICE [HDBIAS]]     serial [--unit=UNIT] [--port=PORT] [--
setkey [TO_KEY FROM_KEY]          setup [--prefix=DIR] [--stage2=STAGE2_
shade INTEGER                      splashimage FILE
terminal [--dumb] [--no-echo] [--no-ed terminfo [--name=NAME --cursor-address
testvbe MODE                       unhide PARTITION
uppermem KBYTES                   vbeprobe [MODE]
viewport x0 y0 x1 y1
[Hit return to continue]

```

3. When manual download GRUB requires you to manually enter all commands in the `/boot/grub/menu.lst` file. It's best to check the current content of the `menu.lst` file using the `cat /boot/grub/menu.lst` command. In this file you need to check what system needs to boot.

```

## can be true or false
# savedefault=false

## ## End Default Options ##

title                               Ubuntu 8.04, kernel 2.6.24-16-server
root                                (hd0,0)
kernel                              /boot/vmlinuz-2.6.24-16-server root=UUID=c5298cc6-16b8-4861
-a586-5d0a58514531 ro splash
initrd                               /boot/initrd.img-2.6.24-16-server

title                               Ubuntu 8.04, kernel 2.6.24-16-server (recovery mode)
root                                (hd0,0)
kernel                              /boot/vmlinuz-2.6.24-16-server root=UUID=c5298cc6-16b8-4861
-a586-5d0a58514531 ro single
initrd                               /boot/initrd.img-2.6.24-16-server

title                               Ubuntu 8.04, memtest86+
root                                (hd0,0)
kernel                              /boot/memtest86+.bin
quiet

### END DEBIAN AUTOMAGIC KERNELS LIST

grub>

```

4. With the sample lines displayed on the screen, you can manually enter all GRUB lines. That means you must enter the root, kernel, and initrd lines. Eg:

root (hd0,0)

kernel /boot/vmlinuz-2.6.24-16-server root = / dev / sda2 ro splash

initrd /boot/initrd-2.6.24-16-server

5. After entering those commands the system will wait for instructions. Usually, you enter the boot command. After entering the command the startup process will start. You need to pay close attention to detecting errors. If the system does not boot normally, it will also display an error message if you manually enter the lines in the `menu.lst` file. If that is the case, you need to check the error and restart the system until the boot process is done normally.

GRUB will load in the first boot phase. There may be errors in the MBR, in the GRUB configuration file or in GRUB loaded files. In those cases you can manually enter all GRUB commands to check for errors. If no error is detected, you can choose to reinstall GRUB.

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