How to Run Any Linux Distribution Directly from Hard Disk

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Most Linux distributions provide ISO files that are designed and built to run in **Live Mode** directly from a bootable media such as **CD /DVD**, **Flash/USB** cards, or even directly from a **Hard Drive** using the **Linux Grub** menu without the need to burn it to a **CD/DVD** or create a bootable USB using USB creator tools.

This tutorial will concentrate on presenting a way you can run some **Linux ISO** distributions directly from your hard disk by editing **Ubuntu 22.04 GRUB2** (works on **Ubuntu 20.04** or earlier) menu which is the default boot loader in most modern Linux distributions.

Running an operating system from a hard disk provides a faster way of using Linux, and also has a great impact on privacy because all your settings and live sessions are not preserved by default.

The distributions presented in this topic are **Rocky Linux**, **Fedora**, **Kali Linux**, **Arch Linux** and Gentoo Live DVD.

Requirements

A newly installed **Ubuntu 22.04** (or any other Linux distribution with the GRUB2 bootloader) is on your system's hard drive.

Step 1: Download Linux Live ISO Files

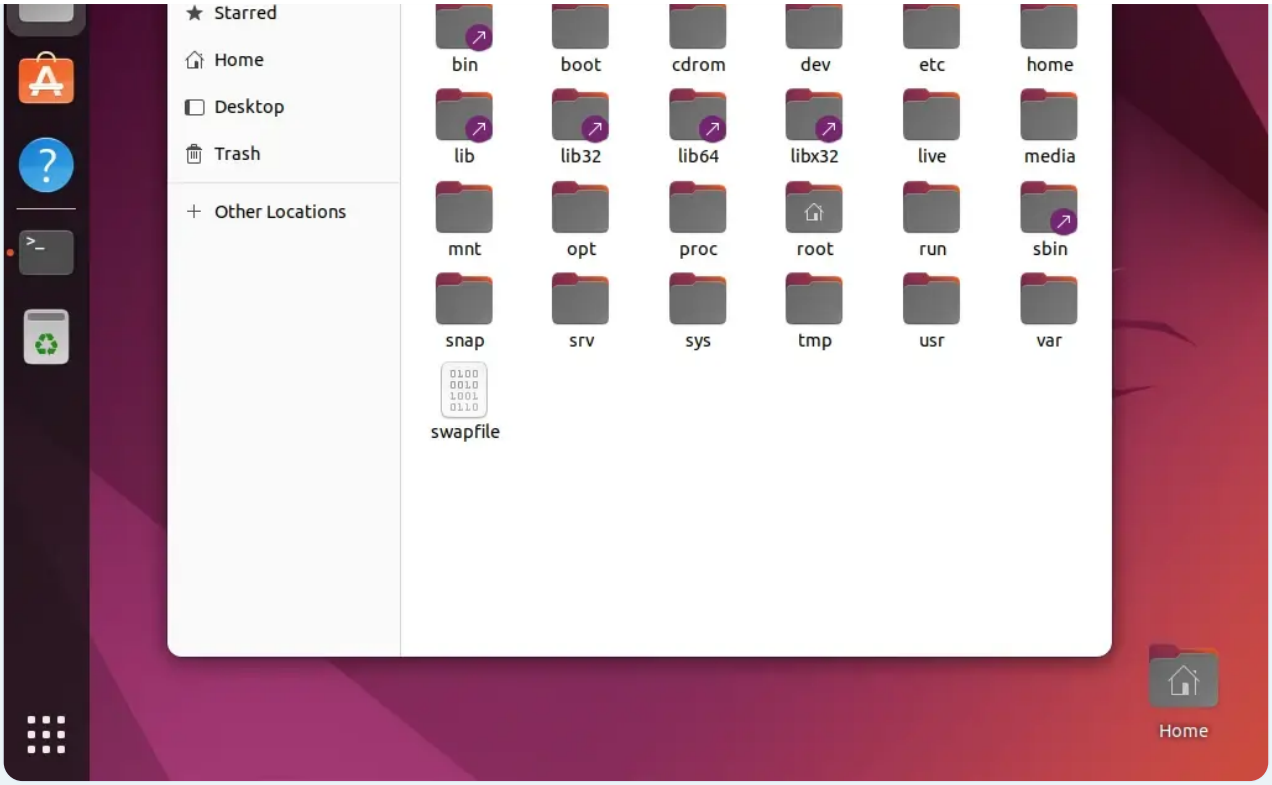
1. To able boot and run any Linux distribution without installing them to your hard drive, make sure to download the "**Live CD/DVD**" release of each Linux ISO image.

- Download Rocky Linux Live ISO Image
- Download Fedora Live ISO Image
- Download Kali Linux Live ISO Image
- Download Arch Linux Live ISO Image
- Download Gentoo Linux Live ISO Image

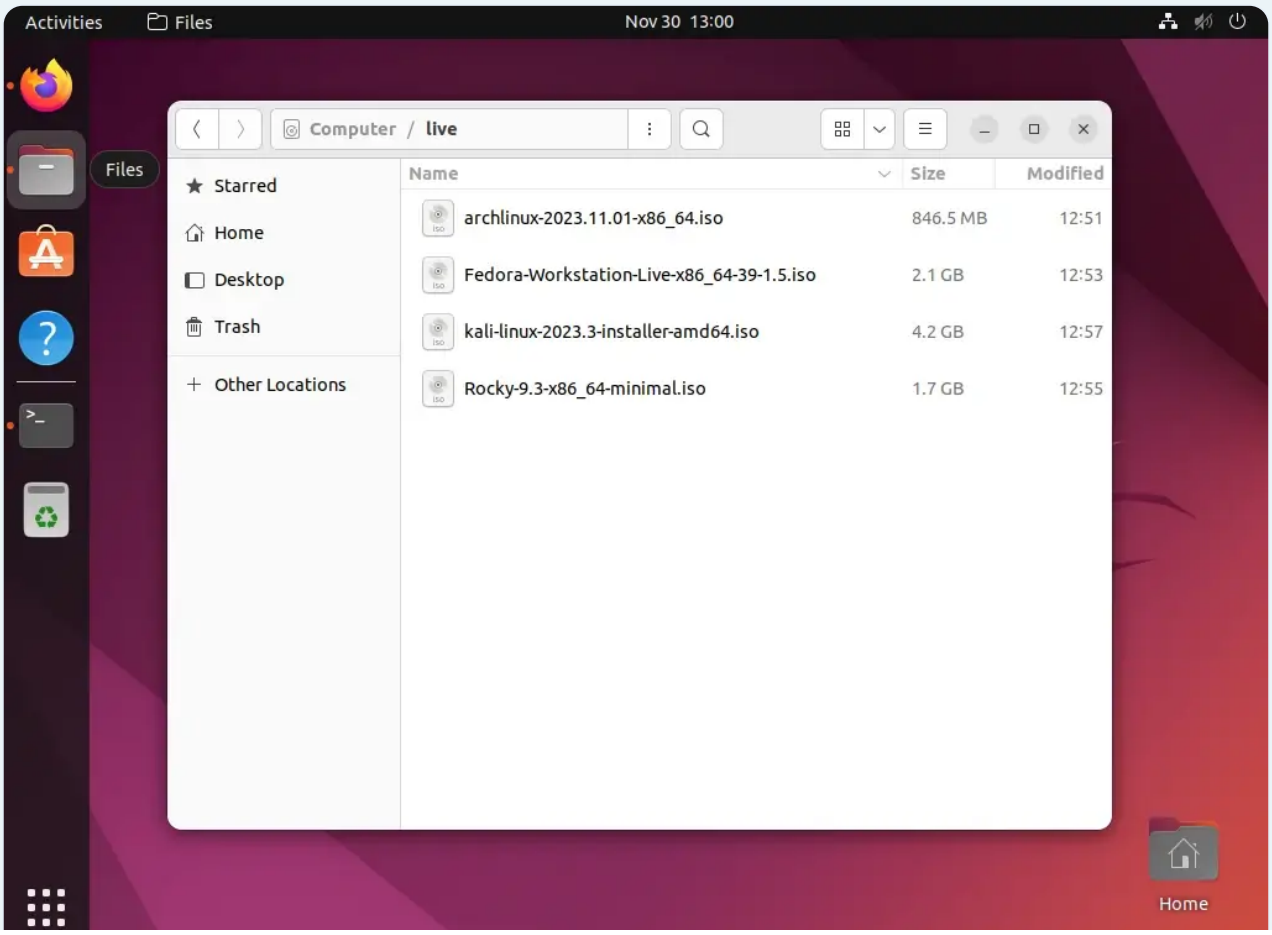
Step 2: Add ISO Images to the Directory

2. After you have downloaded your favorite **Linux ISO Live DVD Images**, open **Ubuntu Nautilus** with root privileges using the '**sudo nautilus**' command from the terminal and create a directory called `live` in your system root path and move the ISO file to this folder.

```
$ sudo nautilus
```



Create Directory in Root Location



Step 3: Find Disk Partition UUID

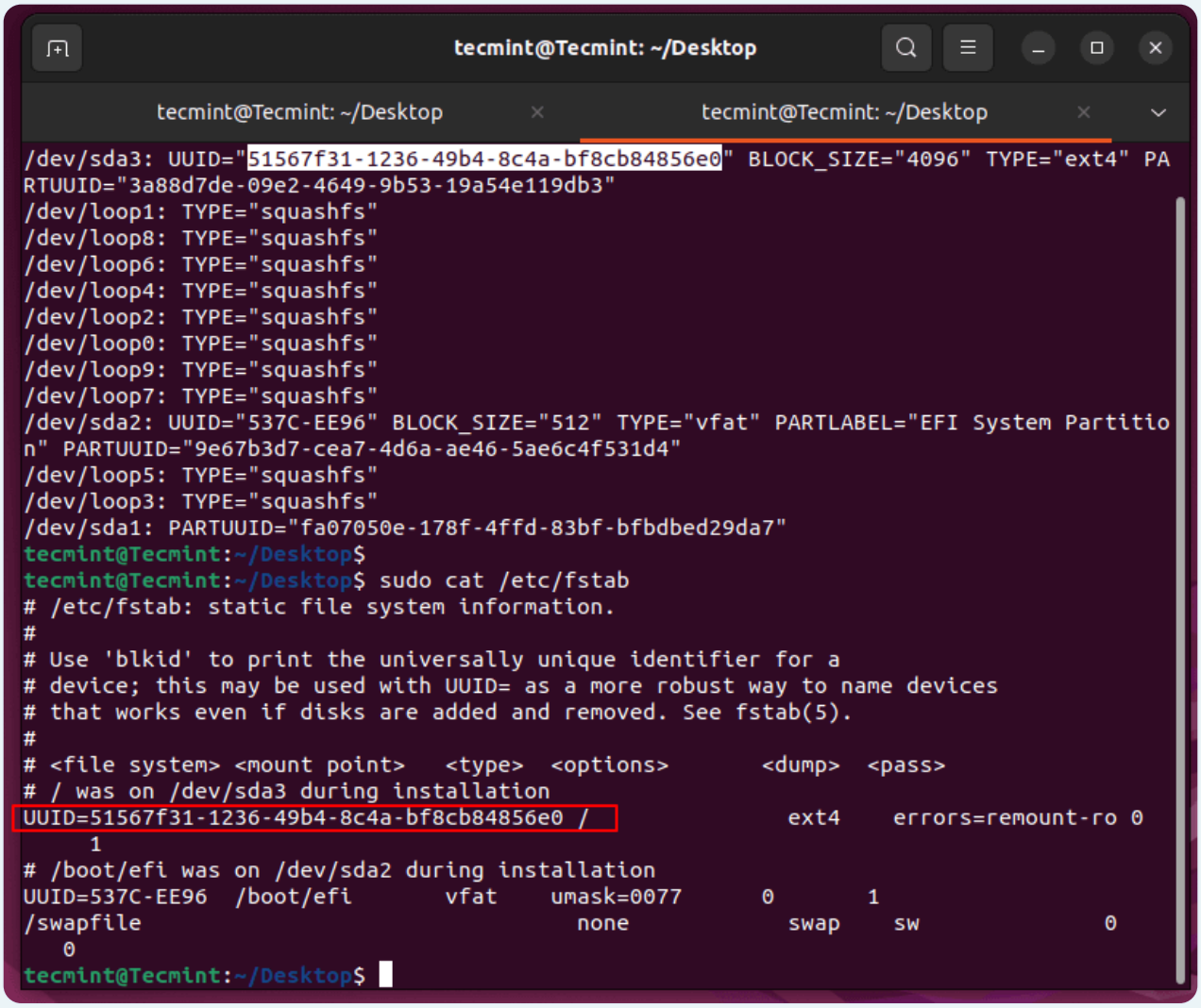
3. To continue further will need to provide **Grub2** with our disk partition **UUID** – **Universally Unique Identifier** (the partition where ISO files are located).

To get partition **UUID** run the following blkid command.

```
$ sudo blkid
```

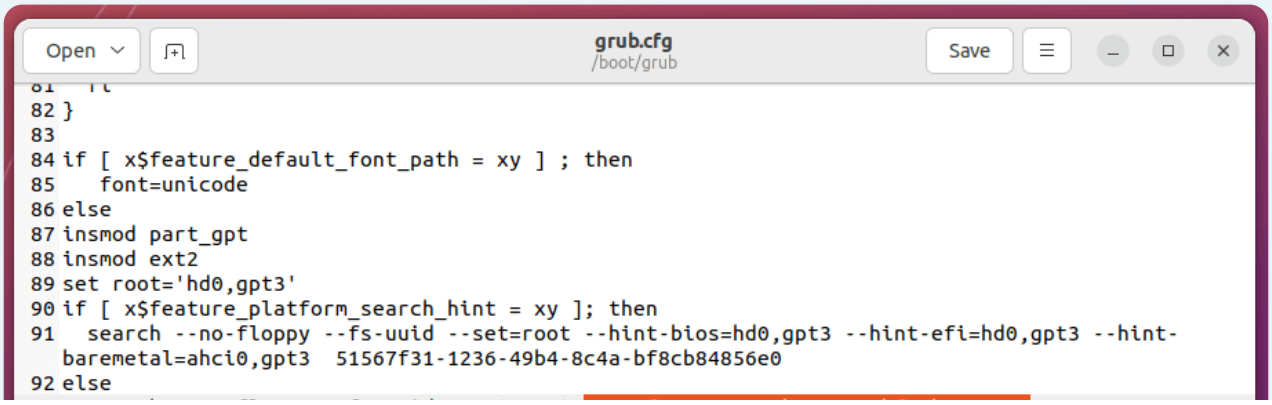
For automatically mounted partitions or hard disks on the system boot run the following cat command.

```
$ sudo cat /etc/fstab
```



Find Linux Partition UUID

4. Another method to get your partition UUID is, to open and visualize `grub.cfg` file content located in **/boot/grub/** path and search for `--fs-uuid` a string (in case you don't have a separated partition for **/boot**).



```
101   insmod gfxterm
102   set locale_dir=$prefix/locale
103   set lang=en_IN
104   insmod gettext
105 fi
106 terminal_output gfxterm
```

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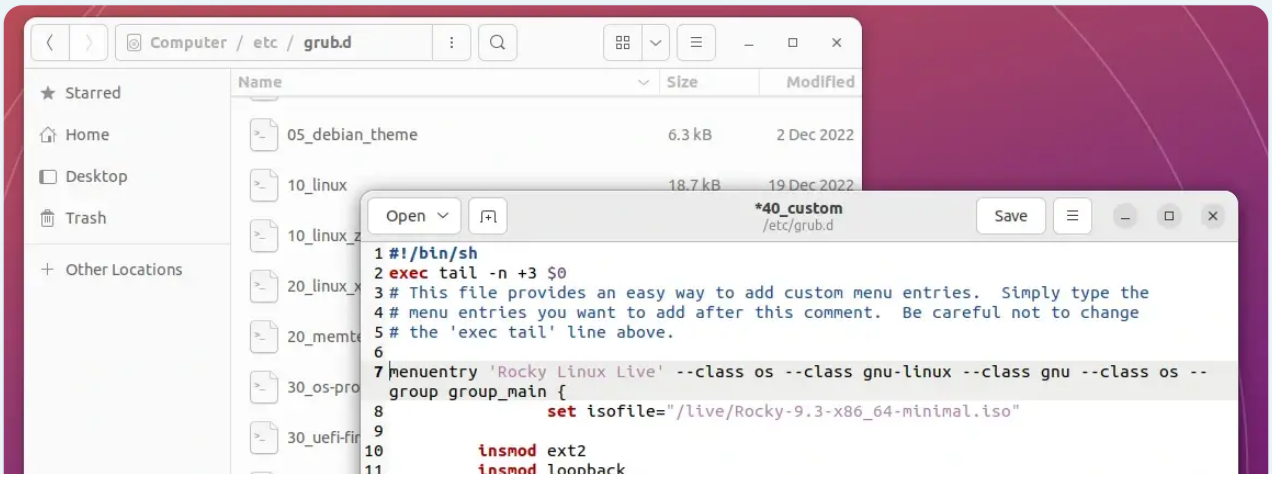
Check Partition UUID in the Grub File

Step 4: Add ISO Images to the GRUB2 Menu

5. After you obtain your root partition **UUID** code move to **/etc/grub.d/** directory, open the **40_custom** file for editing and add the following lines at the bottom of this file.

```
menuentry 'Rocky Linux Live' --class os --class gnu-linux --class gnu --c
                set isofile="/live/Rocky-9.3-x86_64-minimal.iso"

        insmod ext2
        insmod loopback
        insmod iso9660
                set root=(hd0,3)
                search --no-floppy --fs-uuid --set=root 51567f31-1236-49
                linux /live/Rocky-9.3-x86_64-minimal/isolinux/vmlinuz no
                initrd /live/Rocky-9.3-x86_64-minimal/isolinux/initrd.im
}
```



Add Rocky Linux to the Grub Menu

Here the following directives represent:

- **set isofile** = A variable that holds ISO system path location.
- **(hd0,msdos1)** = First partition from first hard disk (In Linux disks are numbered starting with 0) – the same as **/dev/sda3**.
- **–fs-uuid –set=root 51567f31-1236-49b4-8c4a-bf8cb84856e0** = First partition from first hard disk UUID code.
- **linux and initrd** = Custom kernel booting parameters – they are different depending on every Linux distribution.

6. After you finish editing the file, **update-grub** to add the new ISO (in this case **Rocky Linux**) to your Grub2 menu.

```
$ sudo update-grub
```

```
tecmint@Tecmint:/live$
tecmint@Tecmint:/live$ sudo update-grub
Sourcing file `/etc/default/grub'
Sourcing file `/etc/default/grub.d/init-select.cfg'
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-6.2.0-37-generic
Found initrd image: /boot/initrd.img-6.2.0-37-generic
Found linux image: /boot/vmlinuz-6.2.0-26-generic
Found initrd image: /boot/initrd.img-6.2.0-26-generic
Found memtest86+ image: /boot/memtest86+.elf
Found memtest86+ image: /boot/memtest86+.bin
Warning: os-prober will not be executed to detect other bootable partitions.
Systems on them will not be added to the GRUB boot configuration.
Check GRUB_DISABLE_OS_PROBER documentation entry.
done
tecmint@Tecmint:/live$
```

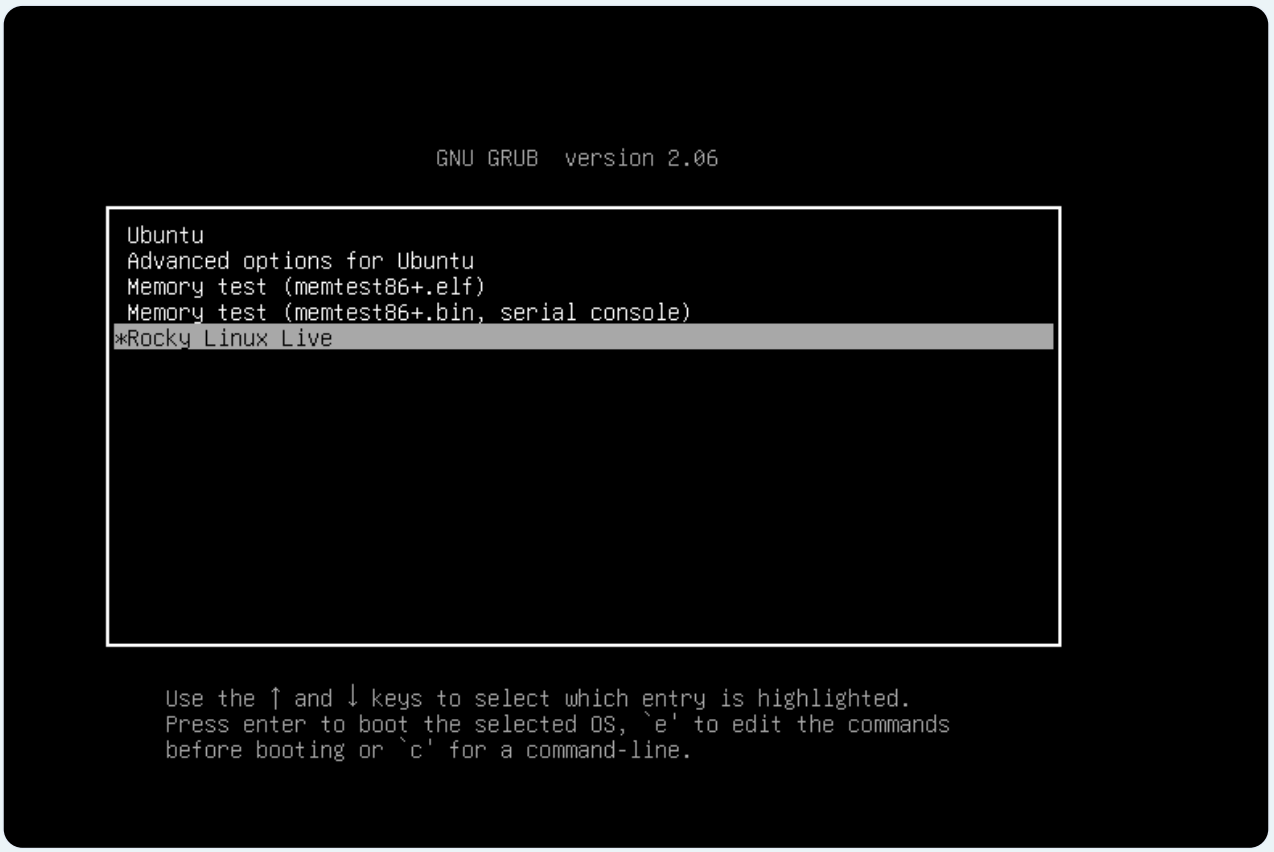
Update Grub to Add ISO Image

To verify it open **/boot/grub/grub.cfg** and search at the bottom for your ISO entry.

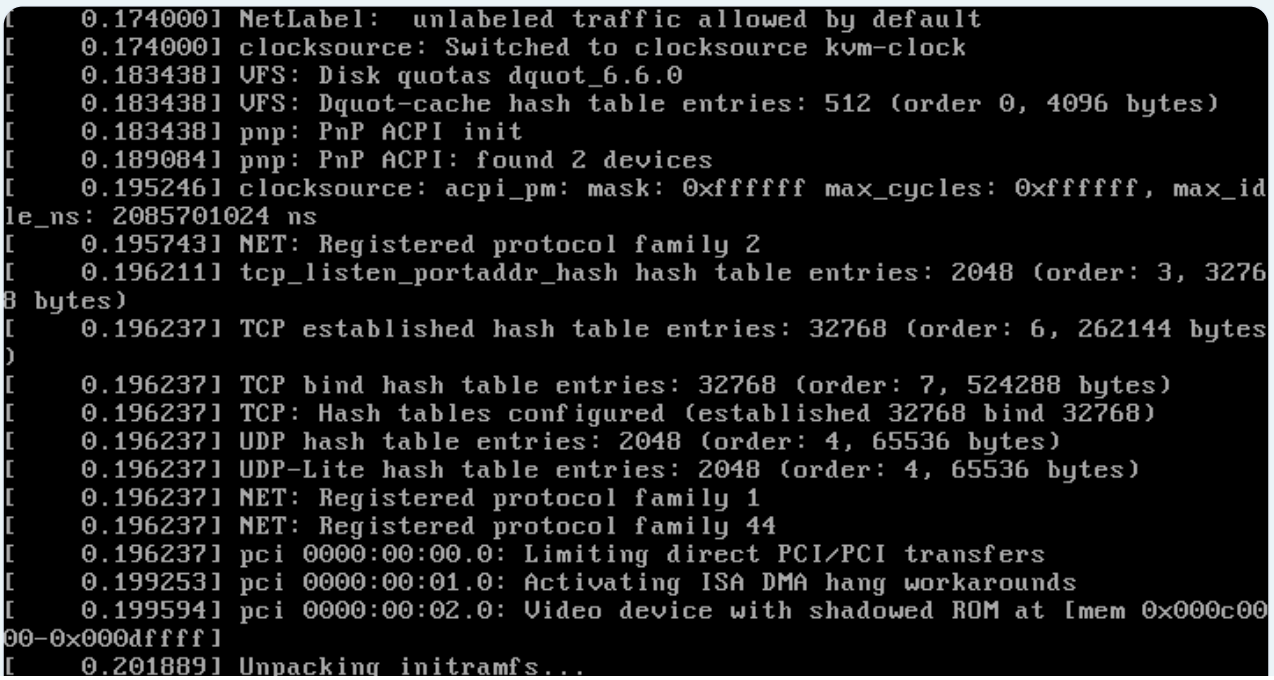
```
### BEGIN /etc/grub.d/35_fwupd ###
### END /etc/grub.d/35_fwupd ###

### BEGIN /etc/grub.d/40_custom ###
# This file provides an easy way to add custom menu entries.  Simply type the
# menu entries you want to add after this comment.  Be careful not to change
# the 'exec tail' line above.

menuentry 'Rocky Linux Live' --class os --class gnu-linux --class gnu --class os --grou
p group_main {
                set isofile="/live/Rocky-9.3-x86_64-minimal.iso"

        insmod ext2
        insmod loopback
        insmod iso9660
               loopback loop (hd0,msdos1)$isofile
               search --no-floppy --fs-uuid --set=root 51567f31-1236-49b4-8c4a-bf8cb84
856e0
               linux (loop)/isolinux/vmlinuz boot=live fromiso=/dev/sda3/$isofile noco
nfig=sudo username=root hostname=tecmint
               initrd (loop)/isolinux/initrd.img
}
### END /etc/grub.d/40_custom ###

### BEGIN /etc/grub.d/41_custom ###
if [ -f  ${config_directory}/custom.cfg ]; then
  source ${config_directory}/custom.cfg
elif [ -z "${config_directory}" -a -f  $prefix/custom.cfg ]; then
  source $prefix/custom.cfg
fi
### END /etc/grub.d/41_custom ###
tecmint@Tecmint:/live$
```

Verify Grub Menu Entry

7. To run **Rocky Linux Live ISO**, reboot your computer, select **Rocky Linux** entry from the GRUB menu then press the **Enter** key.



Boot Rocky Linux from Hard Disk



In the same way, you can add the other **Linux Live ISO** distribution images to the GRUB2 menu as shown. Again open and edit **/etc/grub.d/40_custom** grub file and add the following entries.

For Fedora Live DVD

```
menuentry 'Fedora Live' --class os --class gnu-linux --class gnu --class
        set isofile="/live/Fedora-Workstation-Live-x86_64-39-1.5.

    insmod ext2
    insmod loopback
    insmod iso9660
        loopback loop (hd0,msdos1)$isofile
        search --no-floppy --fs-uuid --set=root 3b87d941-8ee7-43
        linux (loop)/isolinux/vmlinuz boot=live fromiso=/dev/sda
        initrd (loop)/isolinux/initrd.img
}
```

For Kali Linux Live DVD

```
menuentry 'Kali Linux Live' --class os --class gnu-linux --class gnu --cl
        set isofile="/live/kali-linux-2023.3-installer-amd64.iso"

    insmod ext2
    insmod loopback
    insmod iso9660
        loopback loop (hd0,msdos1)$isofile
        search --no-floppy --fs-uuid --set=root 3b87d941-8ee7-43
        linux (loop)/live/vmlinuz boot=live fromiso=/dev/sda1/$is
        initrd (loop)/live/initrd.img
}
```

```
menuentry 'Gentoo Linux Live' --class os --class gnu-linux --class gnu --
                set isofile="/live/archlinux-2023.11.01-x86_64.iso"

        insmod ext2
        insmod loopback
        insmod iso9660
                loopback loop (hd0,msdos1)$isofile
                search --no-floppy --fs-uuid --set=root 3b87d941-8ee7-43
                linux (loop)/live/vmlinuz boot=live fromiso=/dev/sda1/$is
                initrd (loop)/live/initrd.img
}
```

8. Then update your GRUB menu again, reboot your computer, and choose your preferred Linux distribution ISO from the GRUB menu.

```
$ sudo update-grub
```

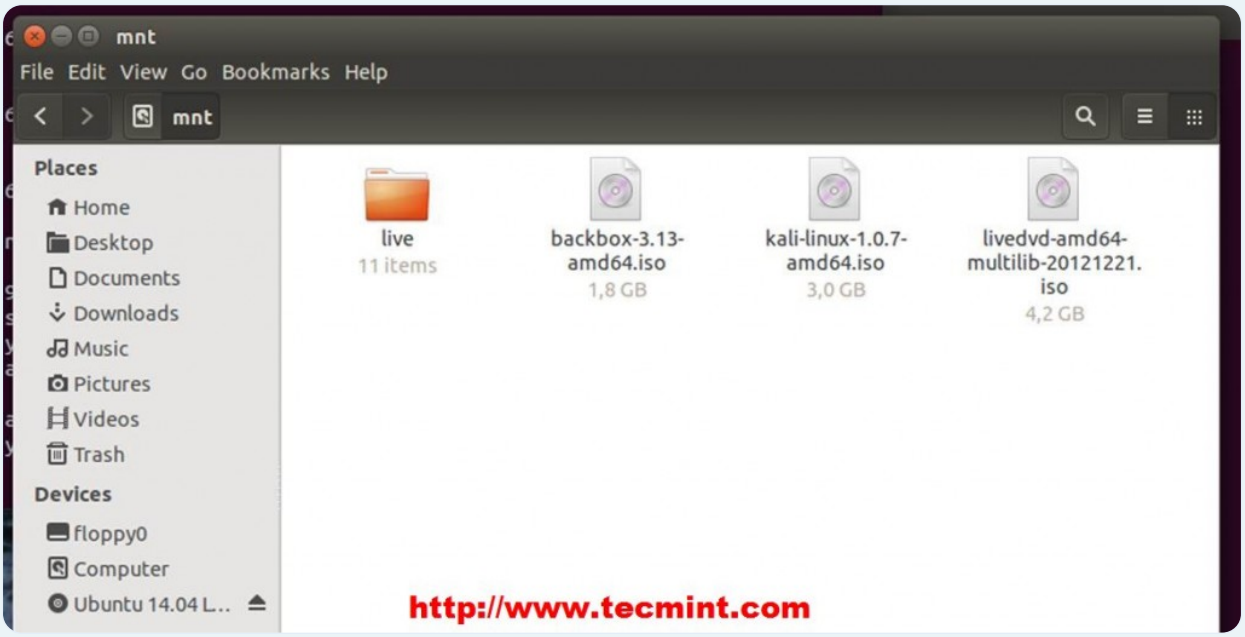
9. If you don't have enough free space on your **root** partition, to host other Linux ISO files you can add another hard disk and move all your Linux distribution ISO files there. After you create a partition and add a file system mount it on the **/mnt** path to make it available.

```
$ sudo mount /dev/sdb1 /mnt
```

10. Then move all ISO on the new hard disk and grab its UUID using the **blkid** command.

```
$ sudo blkid
```

Move ISO Images and Verify UUID



Verify All ISO Images

11. Again open and edit **/etc/grub.d/40_custom** grub file and add other Linux Live ISO distribution images to the **GRUB2** menu using the same procedure but pay attention to every distribution Live Kernel booting parameters which can be inspected by mounting the ISO image using **mount -o loop** option or consult distribution Wiki pages.