Disk Management

How to do data recovery from hard drive

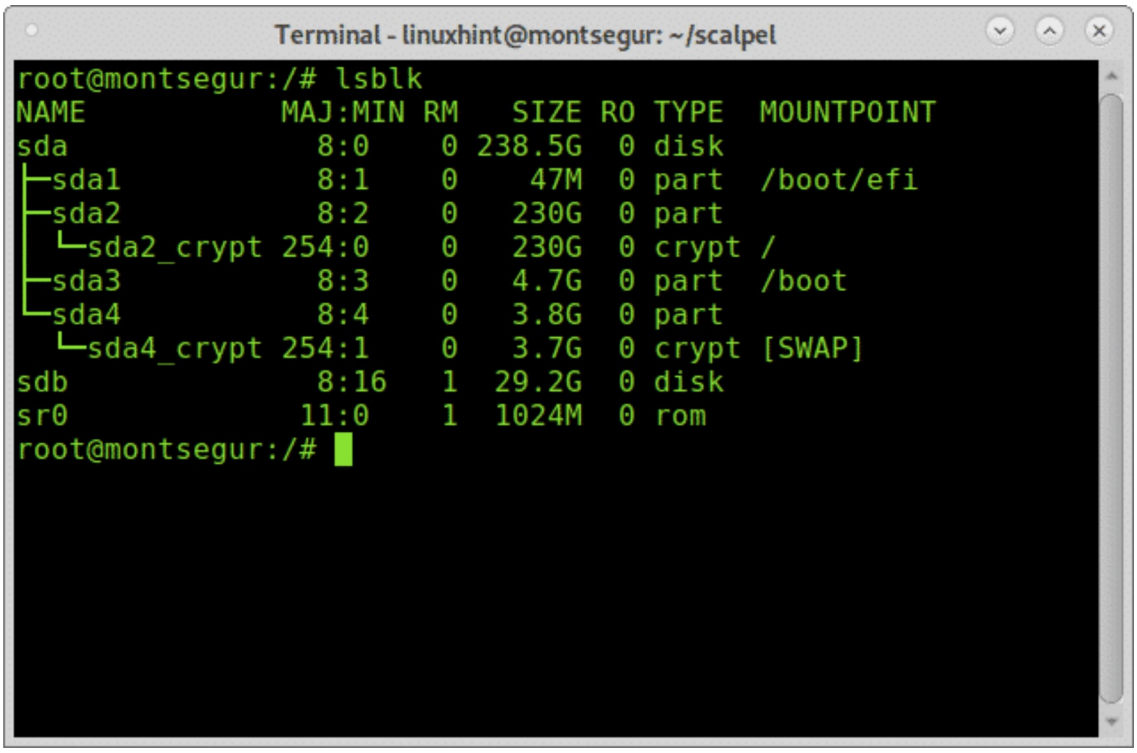
1 week ago • by Ivan Vanney

This tutorial shows how to recover data from storage devices in Linux. In this case the data will be recovered from a SanDisk USB pendrive of 32 GB, yet the process shown in this tutorial is the same as for a regular hard disk. This tutorial will focus on two of the most popular file carving tools, Foremost and PhotoRect, both described in the File Carving Tools article. Both of them will be explained from the installation process on Debian 10 Buster to data recovery.

Data Recovery From Hard Drive with Foremost:

To begin lets see the connected storage devices by using the command ***lsblk***, on the console run:

```
# lsblk
```



Lsblk will show all available storage devices and partitions, including swap and optical devices, in this case I want the sdb device.

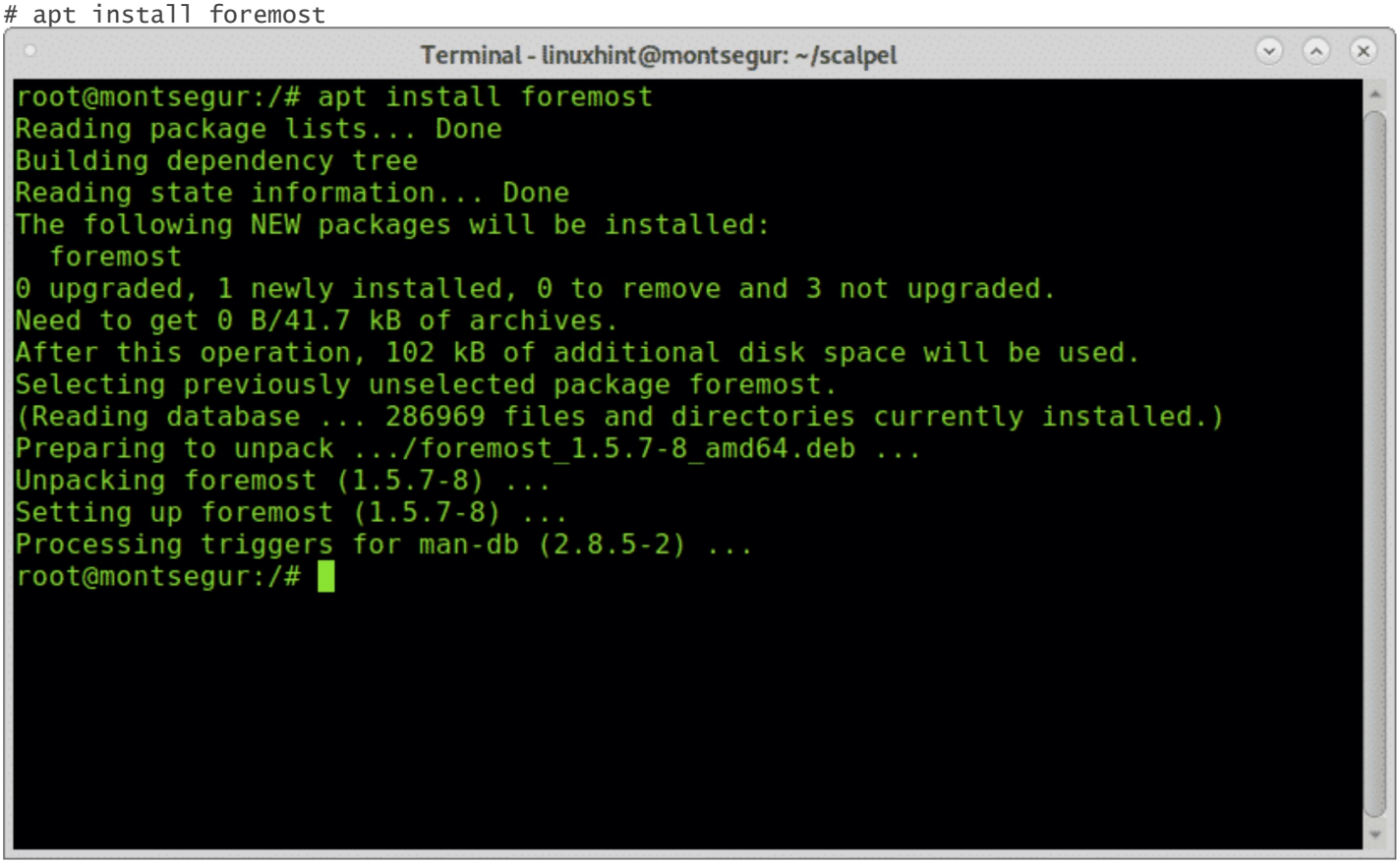
Note: to learn more on the lsblk command read How to List all Linux Disk Devices.

As you can see the 32 GB USB pendrive was called ***sdb*** and that's the device I'll work on.

Data Recovery from USB drive with Foremost:

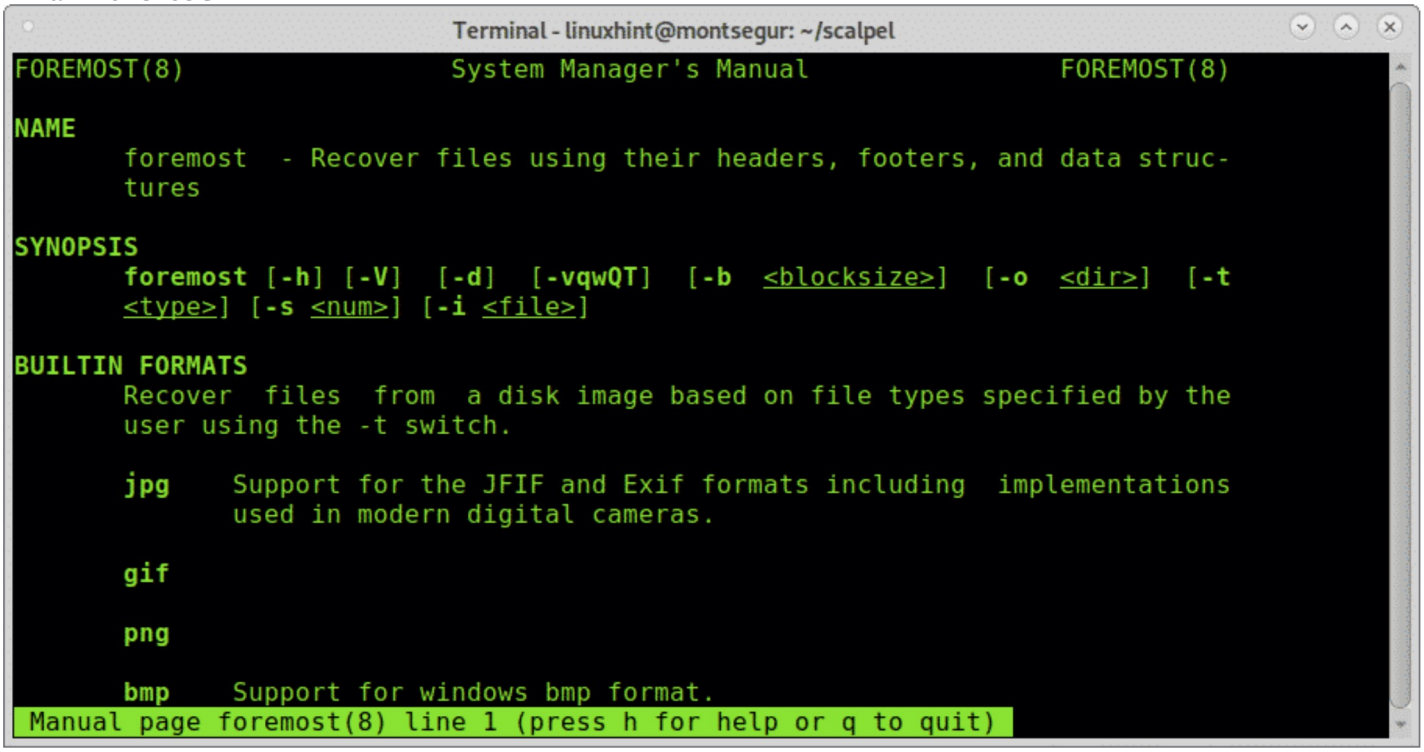
To begin data recovery from a USB drive start by installing Foremost using the APT package manager on Debian or based Linux distributions by running:

```
# apt install foremost
```



Once installed you can display the man page to check all available options:

```
# man foremost
```



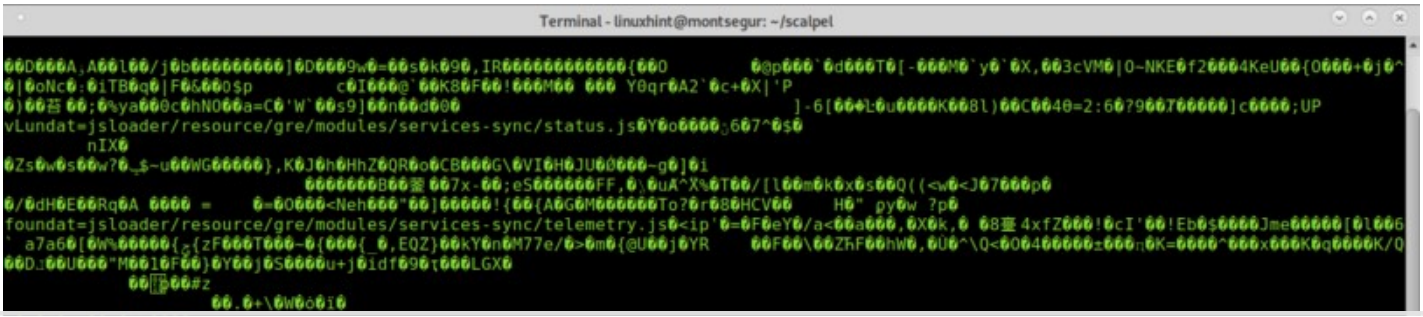
From the man page we understand the flag **-i** is to determine an input file, from which Foremost will start working. It is usually aimed to work with images such as these produced by tools like dd or Encase. To launch Foremost in the simplest way without additional flags run the following command replacing /sdb for the device ID you want to recover data from.

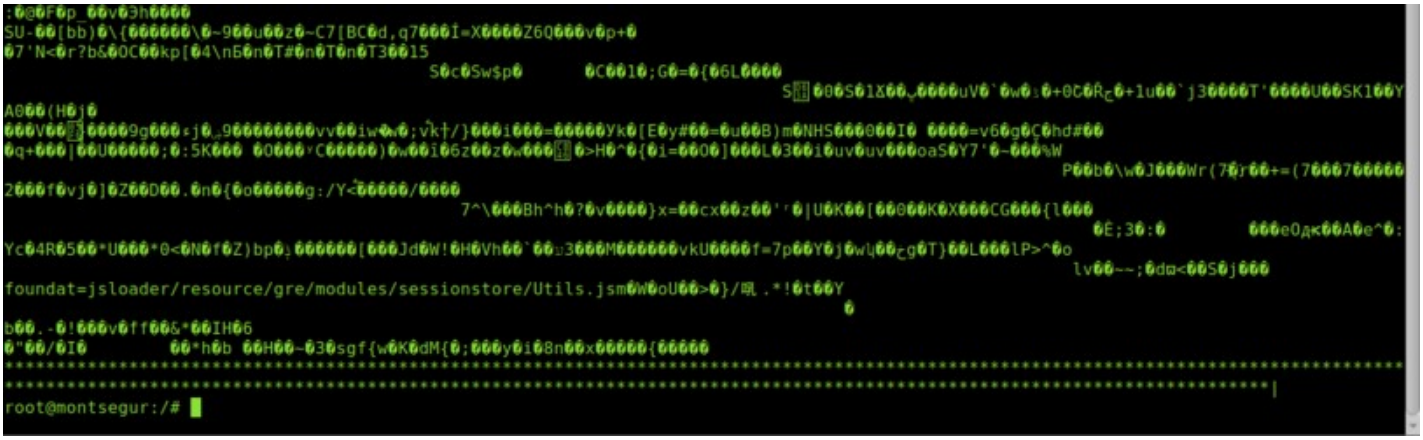
Run:

```
# foremost -i /dev/sdb
```

Where *sdb* put the correct device.

Once executed the carving process will look like:

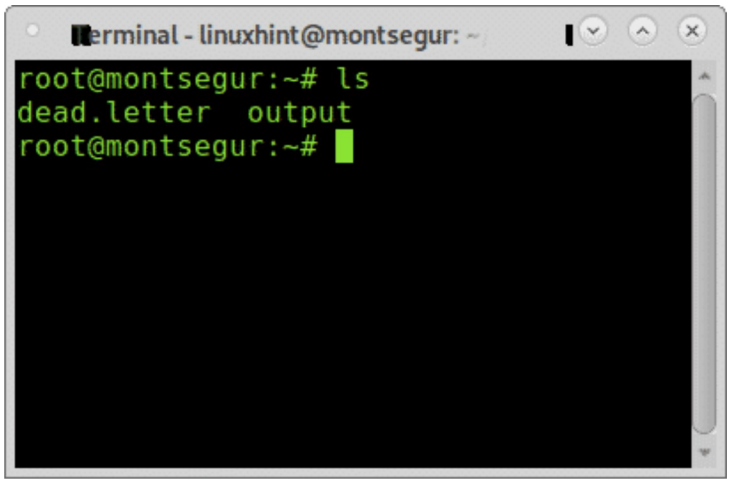




Note: you can also specify partitions like for example /dev/sdb1.

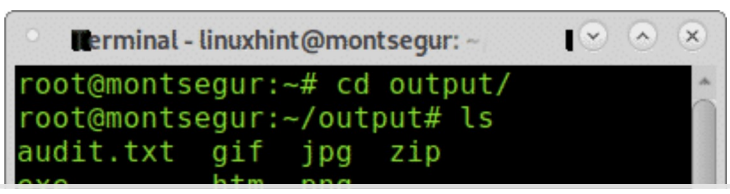
When the process ends run ***ls*** to confirm the creation of a new directory called ***output***:

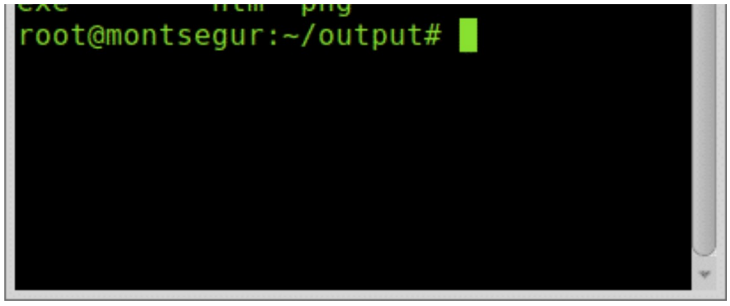
```
# ls
```



As you can see the directory output exists, to see the recovered files enter it using the command ***cd*** (Change Directory) and then run ***ls***:

```
# cd output
# ls
```

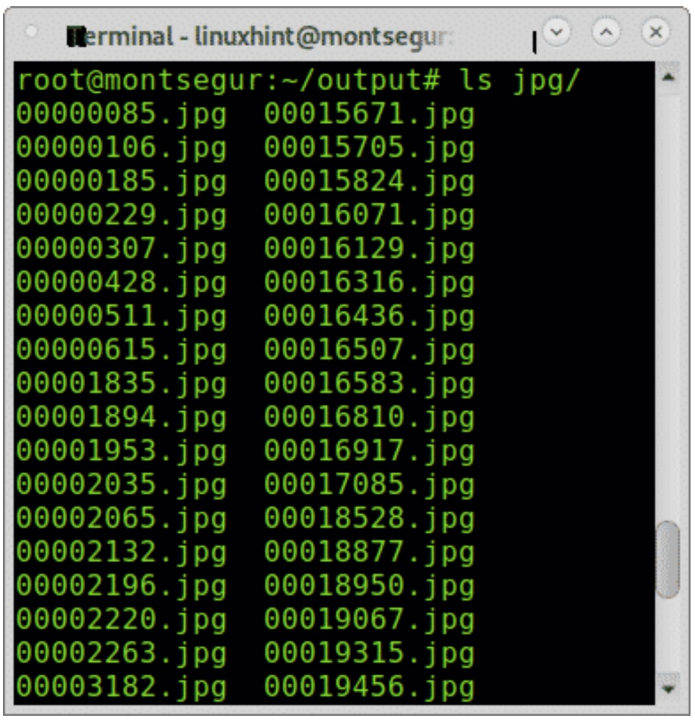




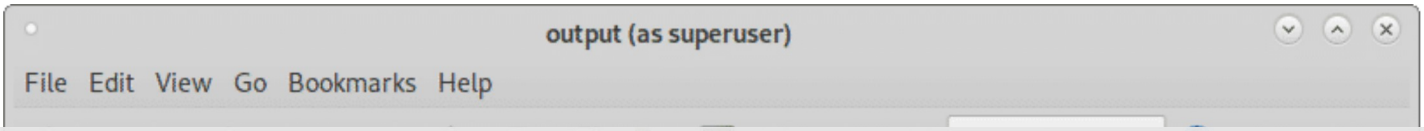
Inside you'll see directories for all file types Foremost managed to recover, additionally you'll see a file called audit.txt with a report on carved files.

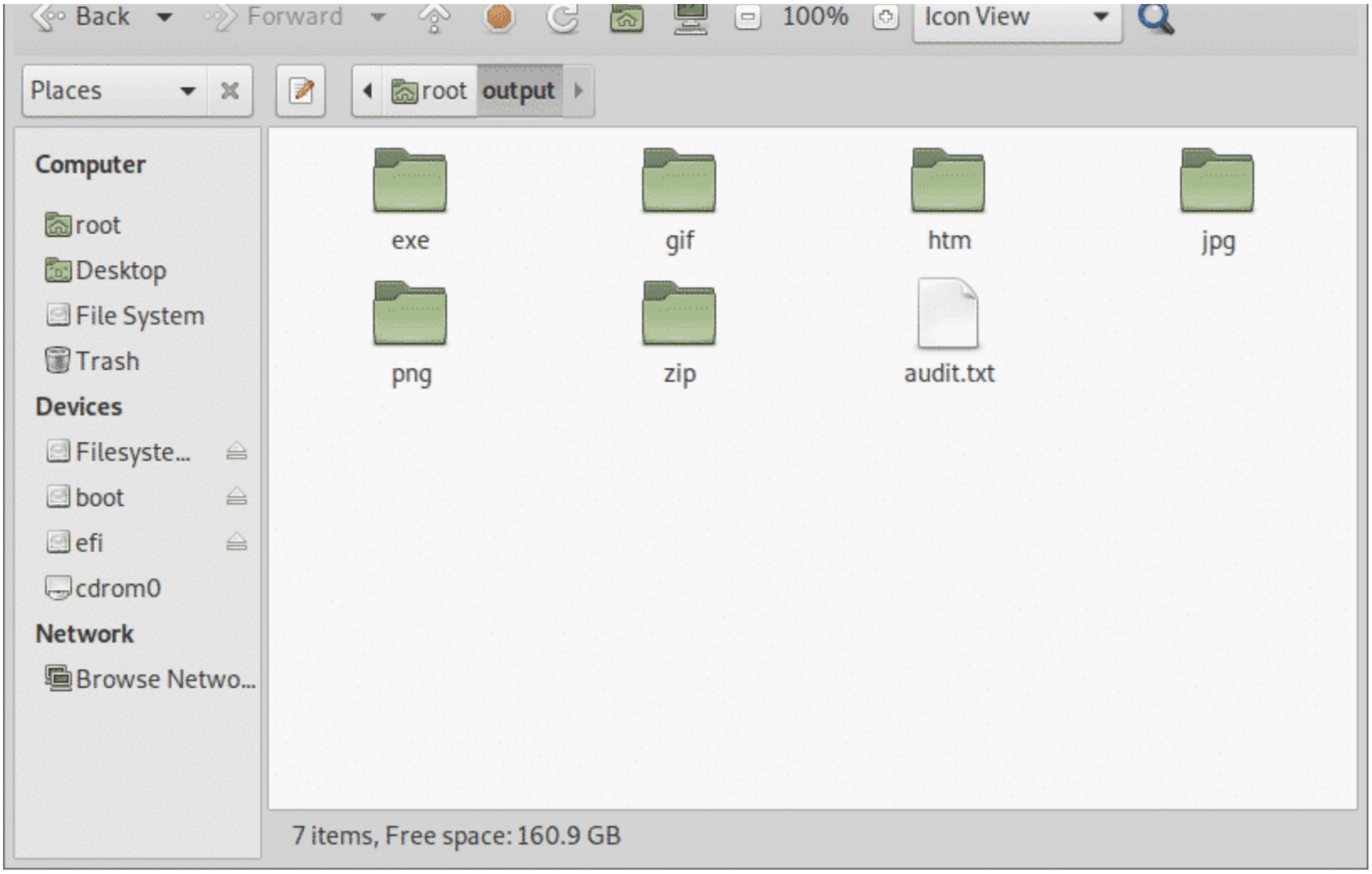
You can check what files were found inside each directory by running ***ls <directory>***:

```
# ls jpg/
```



You can also browse all recovered files through a graphical file manager:



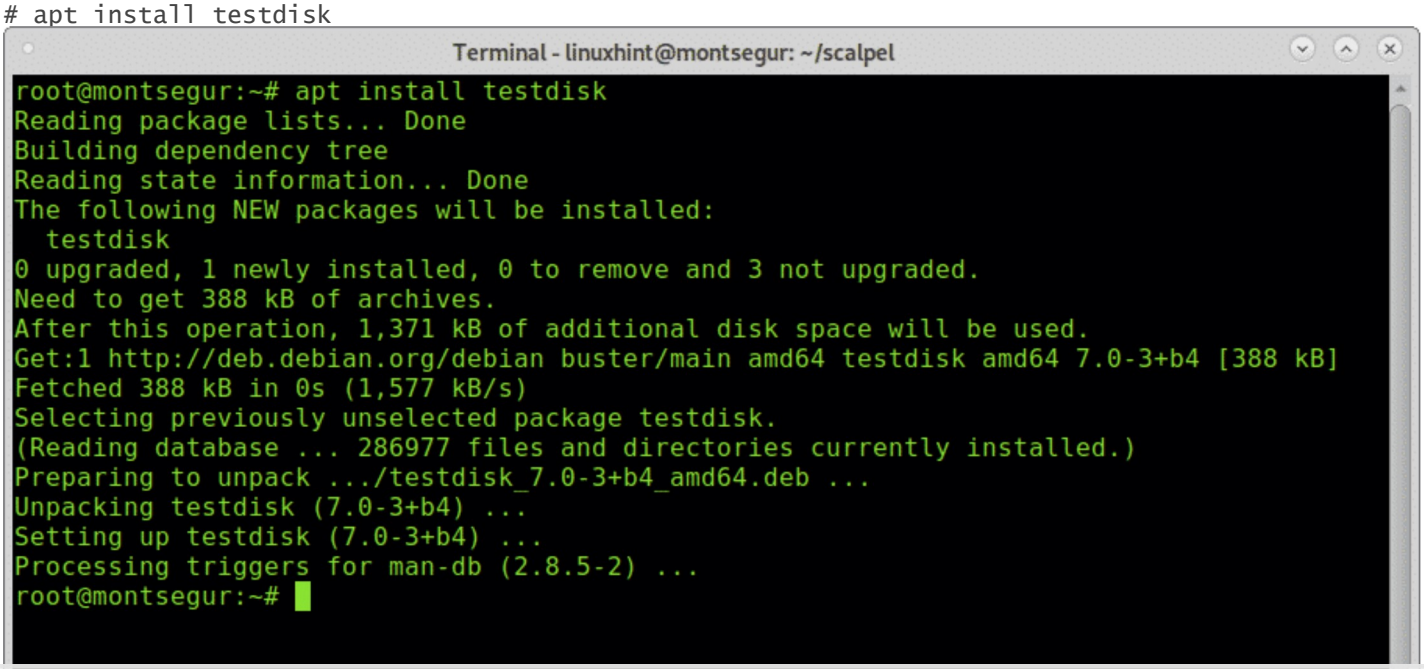


Data Recovery From Hard Drive with PhotoRec:

PhotoRect is together with Foremost the most popular file carving or data recovery tool both for professional forensics and domestic use. While Foremost does a smarter recovery showing a faster performance, PhotoRec's brute force shows better results when carving files. This section shows how to carry out data recovery from hard drive using PhotoRec.

To begin on Debian and based Linux distributions install photorec by running:

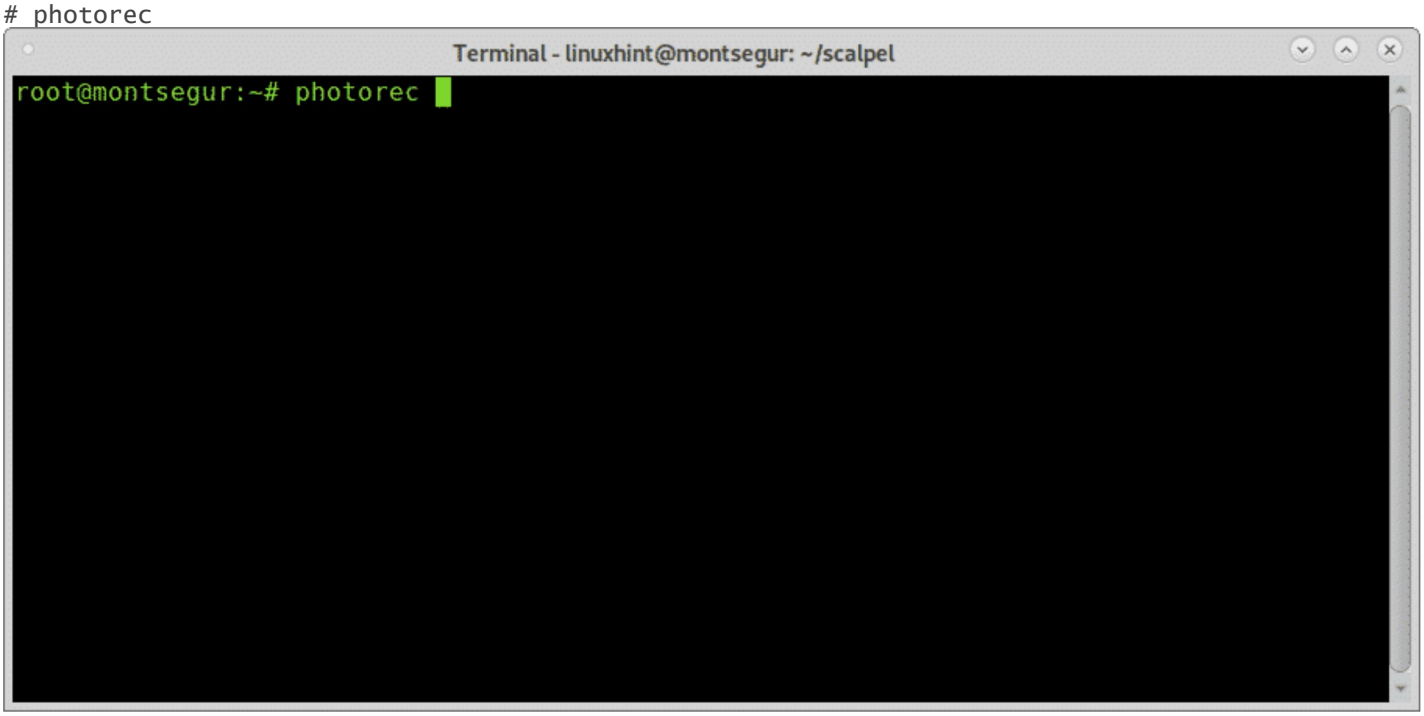
```
# apt install testdisk
```



PhotoRec man page is almost empty, Photorec is pretty simple to use and only needs to be executed, a didactic friendly interface similar to the one of CFDISK will show up to guide you during the whole process.

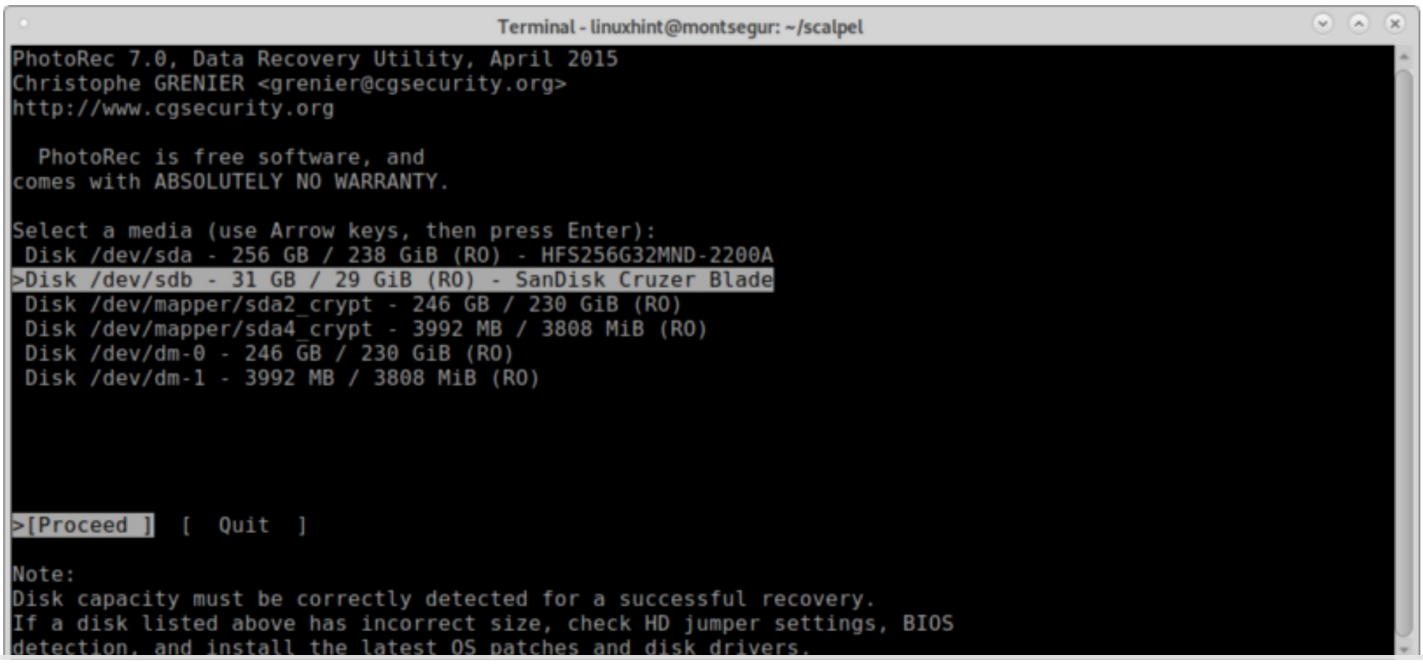
Once installed run it by calling the program:

```
# photorec
```

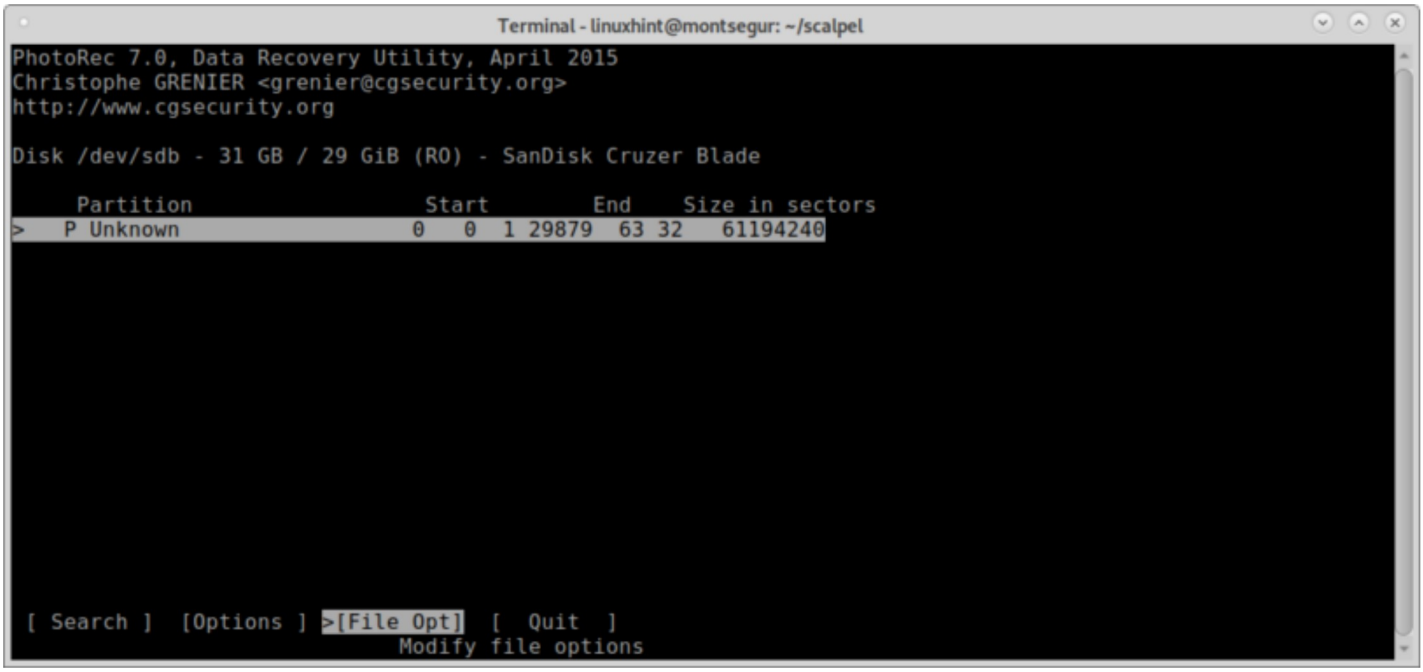


Remember to run PhotoRec with enough permissions to access the device to be carved.

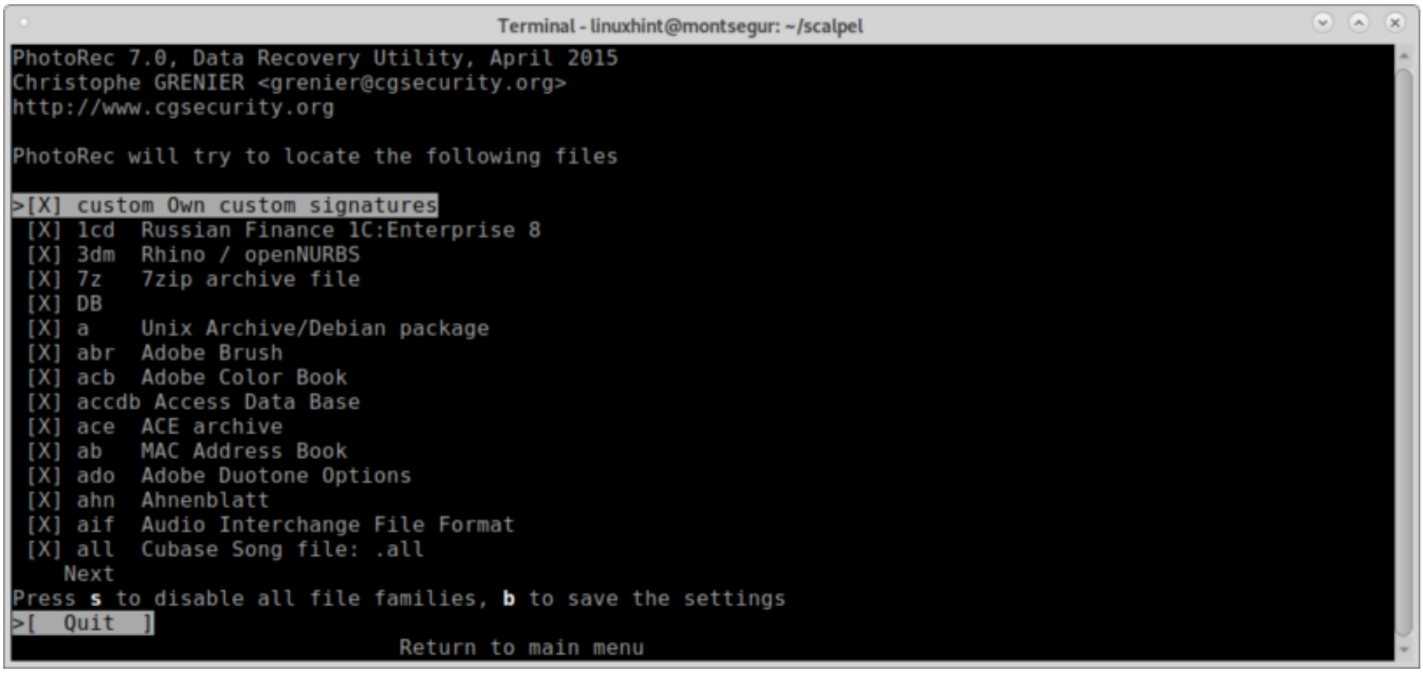
On the first screen you need to select the source disk or image from which PhotoRec needs to recover the data. In this case I'm selecting the device /dev/sdb as shown in the image below:



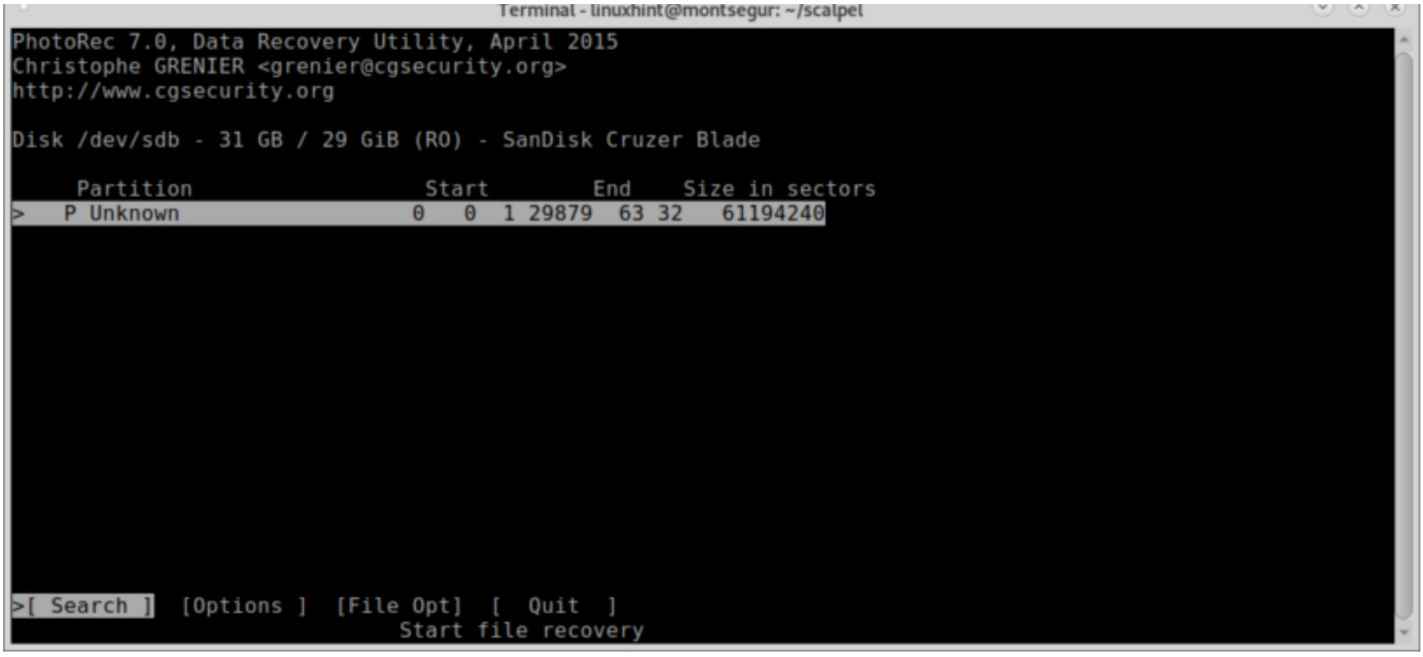
In this step you need to select the partition from which you want to recover the data.
If partitions aren't found and listed before proceeding with a search using the keyboard arrows move to **File Opt** to explore the available options as shown in the image below:



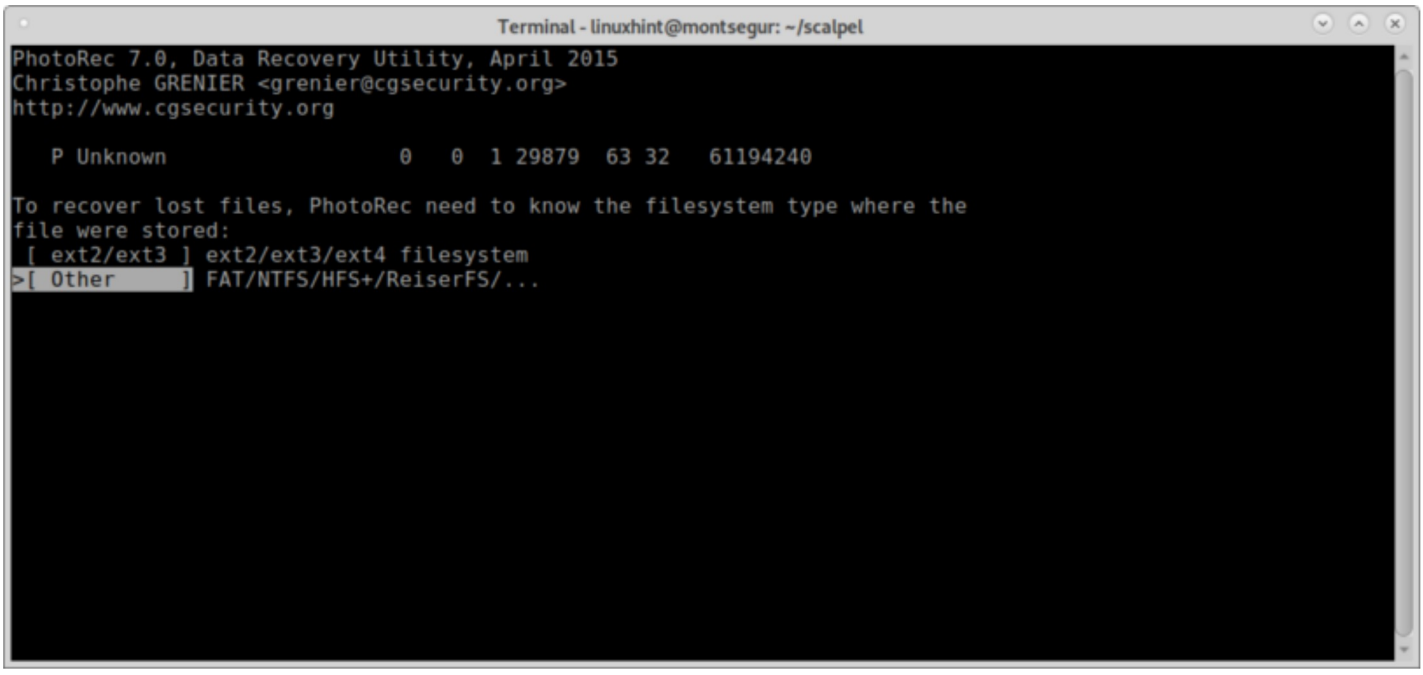
As you can see within **File Opt** you can increase the result accuracy you want by specifying the type of files you are looking for. Select the type of files you want and then press **b** to continue, or **Quit** to go back.



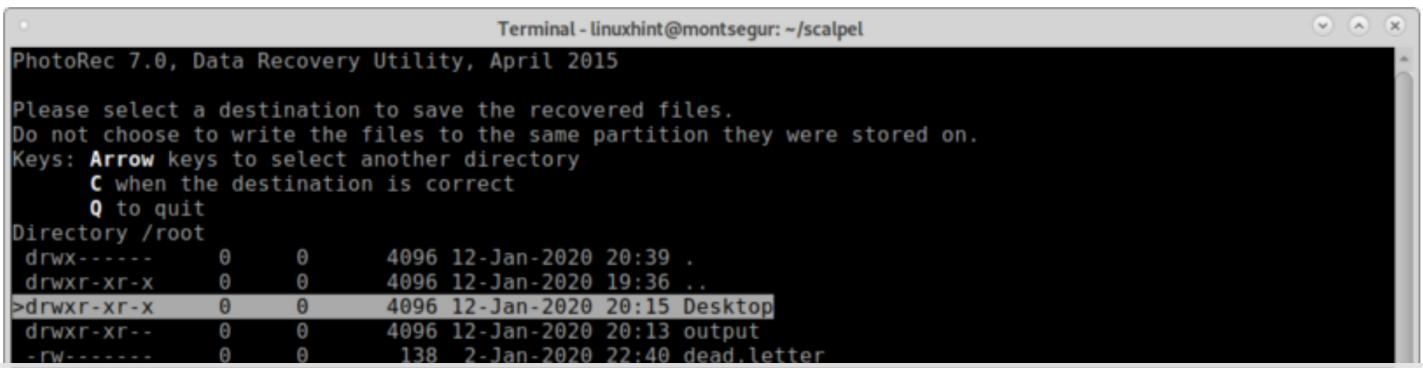
Once back in the previous screen select **Search** and press Enter to continue to begin the data recovery process.



At this stage Foremost will ask what type of filesystem the device has or used to have, in this case it was FAT or NTFS, select the proper filesystem, even if it's currently broken and press **ENTER.**



Finally PhotoRec will ask where you want to save the files, I just left the Desktop but you can create a dedicated folder for it, after choosing the destination press **C** to continue.



```
-rw-r--r--     0     0     40960 12-Jan-2020 20:39 photorec.ses
```

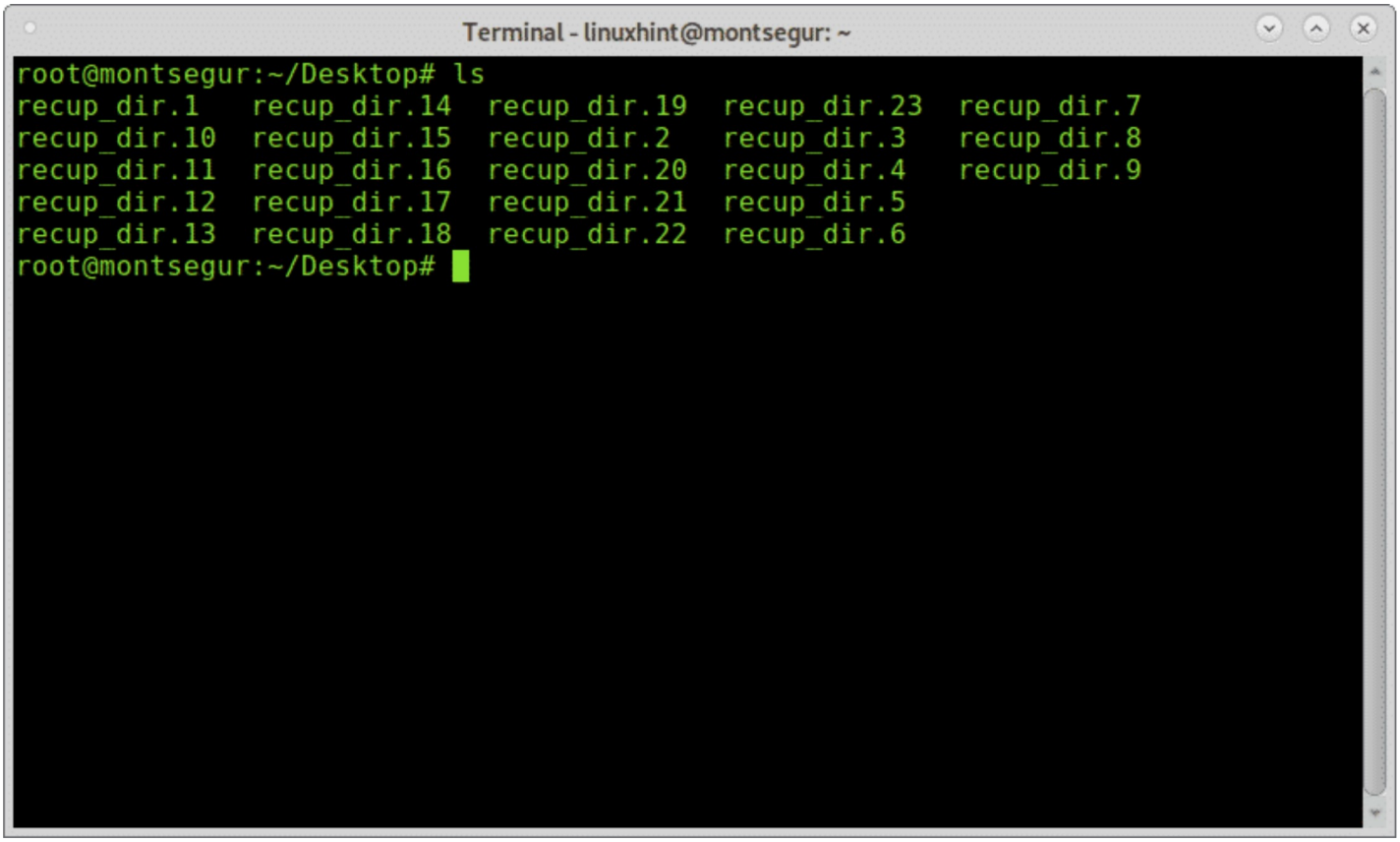
The process will start and may last some minutes or hours depending on the size.

```
Terminal - linuxhint@montsegur: ~/scalpel
PhotoRec 7.0, Data Recovery Utility, April 2015
Christophe GRENIER <grenier@cgsecurity.org>
http://www.cgsecurity.org

Disk /dev/sdb - 31 GB / 29 GiB (RO) - SanDisk Cruzer Blade
     Partition                  Start        End    Size in sectors
   P Unknown                  0   0  1 29879  63 32   61194240


Pass 1 - Reading sector     470269/61194240, 6343 files found
Elapsed time 0h00m09s - Estimated time to completion 0h19m22
txt: 6073 recovered
a: 243 recovered
png: 14 recovered
elf: 4 recovered
jpg: 2 recovered
xz: 2 recovered
exe: 1 recovered
gif: 1 recovered
gz: 1 recovered
ttf: 1 recovered
others: 1 recovered
  Stop
```

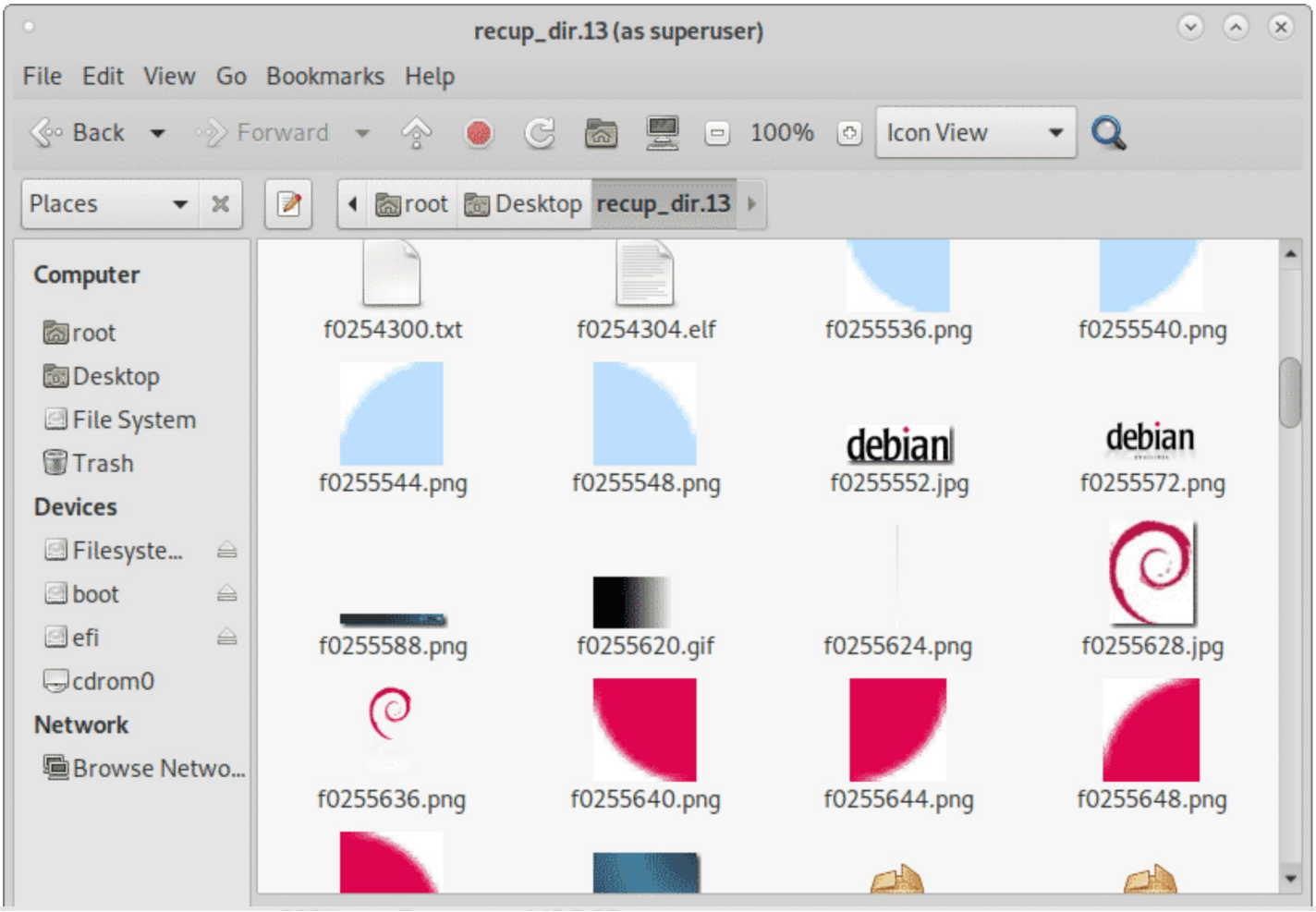
At the end of the process PhotoRect will notify the creation of a directory with the recovered files, in this case recup_dir* inside the Desktop previously selected as destination.

```
Terminal - linuxhint@montsegur: ~/scalpel
PhotoRec 7.0, Data Recovery Utility, April 2015
Christophe GRENIER <grenier@cgsecurity.org>
http://www.cgsecurity.org

Disk /dev/sdb - 31 GB / 29 GiB (RO) - SanDisk Cruzer Blade
     Partition                  Start        End    Size in sectors
   P Unknown                  0   0  1 29879  63 32   61194240


11149 files saved in /root/Desktop/recup_dir directory.
Recovery completed.

You are welcome to donate to support further development and encouragement
http://www.cgsecurity.org/wiki/Donation




[ Quit ]
```

Like with Foremost you can list all files from the console:



Or you can browse files using your preferred graphical file manager:



Conclusion on data recovery from hard drive with PhotoRec and Foremost:

Both tools lead the file carving market, both tools allow to recover any type of files, Foremost supports carving *jpg*, *gif*, *png*, *bmp*, *avi*, *exe*, *mpg*, *wav*, *riff*, *wmv*, *mov*, *pdf*, *ole*, *doc*, *zip*, *rar*, *htm*, and *cpp* and more. Both tools are compatible with disk images like dd or for Encase. While PhotoRec relays on brute force providing a deeper carving, Foremost focuses on block headers and footers working faster. Both tools are included in the most popular forensic suites and OS distributions such as Deft/Deft Zero live or CAINE which were described at https://linuxhint.com/live_forensics_tools/.

Using PhotoRec or Foremost brings the possibility to apply high level forensics tools even for domestic use, the mentioned tools have not complex flags and options to add the launching them.

I hope you found this tutorial on How to Data Recovery from Hard Drive useful. Keep following LinuxHint for more tips and updates on Linux and networking.

ABOUT THE AUTHOR

Ivan Vanney

Ivan Vanney has over 2 years as writer for LinuxHint, he is co-founder of the freelance services marketplace GIGopen.com where he works as a sysadmin.

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