

# How to manage memory to restrict Linux to use too much RAM

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Do not panic! Linux does not consume your RAM. To understand what's going on, consider how Linux manages memory.

## How Linux manages memory

1. How to see the RAM available on Linux
2. How Linux uses RAM
3. The difference between available RAM and available RAM
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## How to see the RAM available on Linux

As with anything else on Linux, there are many ways to check the amount of RAM being used. If you have a commercial operating system, you can easily do this through an application like the **Windows Task Manager** or **macOS Activity Monitor**. This program name depends on the Linux desktop environment you use.

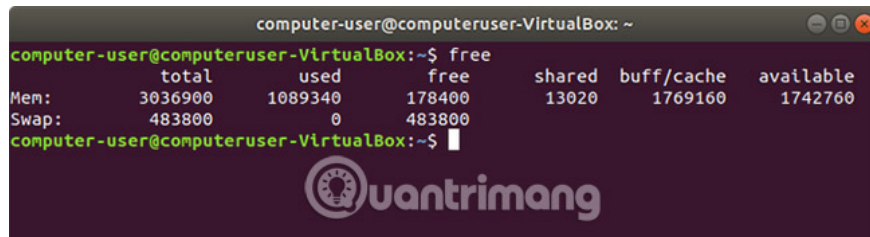
On GNOME, the most widely used option is to open a program called System Monitor. On KDE, there is an entirely similar alternative to Konsole. Other desktop environments have similar tools under different names.

To find an approach that works regardless of your computer environment, you can switch to using the command line. Open the Terminal application and type the following command.

```
free
```

You will see the results look like the following. The numbers will vary depending on the amount of RAM on your device and the number of active programs.

```
computer-user@computeruser-VirtualBox: ~
computer-user@computeruser-VirtualBox:~$ free
               total        used        free      shared  buff/cache   available
Mem:           3036900      1089340       178400         13020     1769160     1742760
Swap:           483800           0         483800
computer-user@computeruser-VirtualBox:~$
```



For a more detailed view of RAM on your device, try this:

```
cat /proc/meminfo
```

The above command loads the same file that the **free** command uses to see how much memory is available on your PC.

If your numbers are not reasonable, then it seems that Linux is consuming your RAM. Suppose you have 4GB of RAM and 3.9GB in use. Only 0.1GB of free space is available for additional applications!

This time, look at the **'available'** column . There, you can see that you actually have 1GB of open data for the application. But how? All are geared towards how Linux manages and uses RAM.

## How Linux uses RAM

The way Linux uses RAM is not much different from Windows and other operating systems. But different systems show what is happening in different ways.

When your computer finds that there is currently no RAM in use, it spends some of this space for the disk cache. In this way, the application stores data in a more accessible location, making the system run faster and smoother. When other applications need more memory, they take the amount of applications needed from this disk cache.

In other words, Linux uses that free space very well while it 'rests'. Why leave all that free memory space wasted?

To know how much memory space is used in this way, look at the **'buff / cache'** column . This is the amount of RAM reserved for the buffer (temporary data) and cache (cache) at the time you run the command. The idea that deleting this space can help increase performance is a common misconception about RAM.

## The difference between available RAM and available RAM

These two concepts are easily confused. This is how Linux considers your RAM.

1. **Used ( Used )**: RAM is currently being used by the application.
2. **Available ( Available )**: RAM can be used for caching on the drive but can be freed for applications.
3. **Free (empty)**: RAM is not used by an application or disk cache.

**Free** and **available** seem like synonyms, but they have technical differences. **Free** is memory that is not used. **Available** is memory currently in use, but can be easily switched for use if needed. For daily use, the amount of available memory is really important.

## How to clear cache RAM and buffer

Suppose, for some reason, you still want to delete the RAM that the Linux kernel is using for its cache and buffer. In fact, doing this will negatively impact performance. If you want your system to run optimally, leave everything in its place.

You will run these commands as a system administrator.

To delete pagecache, enter the following command:

```
echo 1 > /proc/sys/vm/drop_caches
```

To delete dentries and inodes, enter the following command:

```
echo 2 > /proc/sys/vm/drop_caches
```

To delete all pagecache, dentries and inodes together, enter the following command:

```
echo 3 > /proc/sys/vm/drop_caches
```

If these commands do not improve PC performance, why run them? Doing so is to compare your computer's performance after making changes without having to restart. If you don't measure or test your PC, there's very little reason to touch these parts.

## How to view and close programs

All of this means you don't need to check RAM and manage memory on Linux? Not really.

Although Linux knows how to optimize RAM, that doesn't mean your application is the same. Sometimes your browser will take up all the memory. A game can take over and not release any system resources. The image viewer can be suspended when trying to load an extremely large image.

To see which programs are causing your computer problems, try the following **top** command:

```
top
```

The result will look like this:

```
computer-user@computeruser-VirtualBox: ~
computer-user@computeruser-VirtualBox:~$ top
top - 14:14:59 up 5 min, 1 user, load average: 1.24, 1.25, 0.67
Tasks: 191 total, 2 running, 189 sleeping, 0 stopped, 0 zombie
%Cpu(s): 99.2 us, 0.8 sy, 0.0 ni, 0.0 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
KiB Mem : 3036900 total, 208968 free, 1071040 used, 1756892 buff/cache
KiB Swap: 483800 total, 483800 free, 0 used, 1760988 avail Mem

  PID USER      PR  NI   VIRT   RES   SHR  S  %CPU  %MEM    TIME+  COMMAND
 2421 root        20   0 170740 105196 58148 R  98.3   3.5   1:44.77 unattended-+
 1795 compute+  20   0 3027512 457424 94296 S   0.7  15.1   0:22.18 gnome-shell
 1899 compute+  20   0 451704 23064 18072 S   0.7   0.8   0:00.13 gsd-wacom
 1987 compute+  20   0 895772 102148 29428 S   0.3   3.4   0:01.90 gnome-softw+
 2071 root        20   0 549712 19792 14524 S   0.3   0.7   0:00.40 fwupd
 2344 compute+  20   0 46336 3888 3228 R   0.3   0.1   0:00.74 top
 4562 compute+  20   0 638200 33876 27628 S   0.3   1.1   0:00.18 gnome-screee+
   1 root        20   0 154868 8748 6420 S   0.0   0.3   0:01.91 systemd
   2 root        20   0 0 0 0 S   0.0   0.0   0:00.00 kthreadd
   4 root        0 -20 0 0 0 S   0.0   0.0   0:00.00 kworker/0:0H
   5 root        20   0 0 0 0 S   0.0   0.0   0:00.04 kworker/u2:0
   6 root        0 -20 0 0 0 S   0.0   0.0   0:00.00 mm_percpu_wq
   7 root        20   0 0 0 0 S   0.0   0.0   0:01.20 ksoftirqd/0
   8 root        20   0 0 0 0 S   0.0   0.0   0:00.27 rcu_sched
   9 root        20   0 0 0 0 S   0.0   0.0   0:00.00 rcu_bh
```

Now that you have discovered a problematic program, what can you do with it? One option is to use the **kill** command . To do so, note that the PID number appears next to the program when you enter the **top** command . You will need it.

```
kill -9 2470
```

Alternatively, you can use the **killall** command to close the program with its name.

```
killall firefox
```

Unlike many things in life, your computer memory can be more or less self-managed. Here, the article looks at ways to find out what's going on and when users need to act. Now, you know how to see how much memory is using and which program is using it. You can also take a few steps to stop tasks that are taking up too much memory space.

Good luck!

See more:

1. 8 easy ways to free RAM make the machine run faster
2. Top 5 RAM optimization software, enhance computer performance
3. Causes for computers to be "slow like turtles"

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