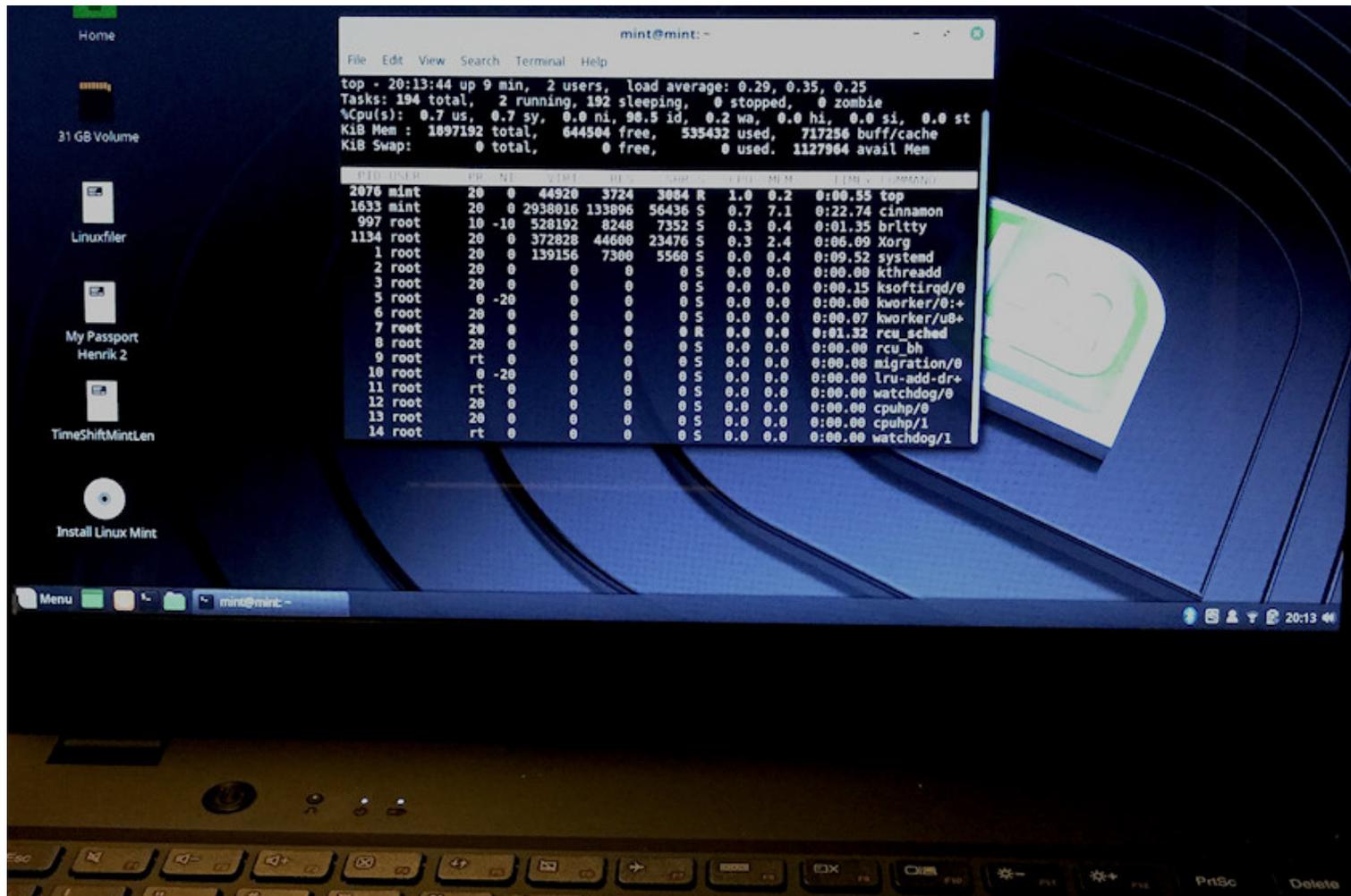


Hemrin ⁽¹⁾

How RAM memory hungry are Linux distros?



Linux Mint LMDE 3 is loaded on my laptop, with terminal window open [photo: Henrik Hemrin]

Another chapter in my Linux journey

I have a cheap laptop which could not handle Windows 10 updates any more, "**Short life time for my cheap laptop (/business-blog/45-short-life-time-for-my-cheap-laptop)**". I swapped Windows 10 for Linux Mint 19 Cinnamon (now 19.2), and got my "**Cheap laptop reborn (/business-blog/147-cheap-laptop-reborn)**".

Now, in my at least third edition of this article, I have swapped from Linux Mint 19.2 Cinnamon to Linux Mint 19.2 Xfce. More about that further into the article.

I have been curious in Linux for many years. Back in time I was using Unix on a Sun machine at work for several years, during that time Linux was invented.

Linux is actually the central "kernel", the complete operating system is more correct to refer as "GNU/Linux". Although in daily talk it is often just "Linux". Linux is an alternative Operating system to Windows, macOS and ChromeOS. GNU/Linux have more than hundred different Operating systems available based on the Linux kernel, so GNU/Linux is actually not one alternative, there are multiple alternatives. To be fair, ChromeOS, is actually also

based on Linux.

I was researching about different Linux distributions (distros) before I finally selected Linux Mint with the Cinnamon desktop as my choice to install. I do indeed like both Mint and its Cinnamon desktop.

One common application to use is a web browser. Therefore I did some research of how hungry some different browsers are, see "**Memory resources for web browsers in Linux Mint (/business-blog/161-memory-resources-for-web-browsers)**".

My Linux Mint Cinnamon works, but the needed resources are quite high for this cheap laptop. The amount/which applications I can use is limited.

Main characteristics of this laptop: CPU: 1.60 GHz dual core, eMCC (SSD) Hard drive: 32 GB and RAM: 2 GB.

Now I have come to next step to investigate how to be able to enjoy this Linux laptop even more; I will look into RAM memory resources for the operating system.

So far, in my exploring of Linux Mint for half a year, I am happy with Linux Mint Cinnamon. It is nice looking, stable, good functions, a lot of software in repository, updates works well, yeah, it is indeed a good operating system.

My primary intention with my testing in this article is to compare the Linux Mint variants, and benchmark them to a few other distros. To bear in mind, the "desktop environment" of a distro, is not only the "layout" of the screen, it also mean different "basic" tools, like different file managers as an example.

There are hundreds more distros out there, and in long term I may very well use one of those other. I have no intention to benchmark all good distros in this evaluation.

The magazine **Linux Journal** (<https://www.linuxjournal.com>), January 2019, the article **The State of Desktop Linux 2019** (<https://www.linuxjournal.com/content/state-desktop-linux-2019>), has a chart for RAM usage of six different desktop environments, measured on Debian. It gives a good overview. However, I want to do a test myself and do it slightly different, and see how it is on my own laptop. So, here comes my findings.

Test objects

Linux Mint (<https://www.linuxmint.com>) is available in four flavors. Three of the flavors are based on Ubuntu, but with different desktops:

- Cinnamon 19.1
- Cinnamon 19.2
- MATE 19.1
- Xfce 19.1
- Xfce 19.2

The fourth Mint flavor is instead based on Debian (and Ubuntu is based on Debian). It only comes with Cinnamon desktop:

- LMDE 3

I benchmark with four other distros. All except the first one are generally seen as lightweight:

- elementary 5.0 (<https://elementary.io>)
- Peppermint 10 (<https://peppermintos.com>)
- Puppy Ubuntu Bionic Pup 64 8.0 (<http://puppylinux.com>)
- Slax 9.5.0 (latest is 9.9.1) (<https://www.slax.org>)

Test condition

All distros were started via USB, except Slax, which I started from a DVD. I was connected to WiFi, and I had also a portable USB hard drive connected. But else I had no application ongoing started by myself. Hopefully the figures are in a relatively comparable idle status. However, the more I think of it, I should have been more careful in when I measure, what applications I have started or closed, and take an average value over a certain period of time. Still, I think the result give an indication.

Comparison Live-USD and installed Linux Mint

The "Linux Mint 19.1 Cinnamon Current installation" and "Linux Mint 19.2 Cinnamon Current installation", is the installed operating system on the laptop hard drive, with my configuration, which among else includes VPN service activated. It should also be said that other programs are more or less active, compared to the Live-CD-

versions above.

Linux Mint 19.2 Cinnamon

Yesterday, 3 August 2019, I upgraded my laptop from LM 19.1 to LM 19.2. I also afterwards updated the Linux Kernel to 4.15.0-55. LM 19.2 was released a couple of days ago. The new release includes also a new release of the Cinnamon desktop, release 4.2. Cinnamon 4.2 is stated to need significantly less RAM memory than 4.0. Therefore, I was curious to see how it is on my machine. **More about Linux Mint Cinnamon 19.2 on their web site.** (https://www.linuxmint.com/rel_tina_cinnamon_whatsnew.php)

Linux Mint 19.2 Xfce

A couple of weeks ago (said 27 September 2019), I replaced Cinnamon desktop with Xfce. The Xfce version is 4.12, released in February 2015. Xfce launched the new version 4.14 in August 2019. I expect this release 4.14 to be included in Linux Mint 19.3 Xfce, late 2019.

Xfce is considered as desktop needing few resources. As my laptop does not have so much resources, I want to free so much resources as possible to applications. Only to start a browser like Firefox will eat a lot of the free resources. I have used both Cinnamon and Xfce too little, to really give a bold statement on advantages and disadvantages. Cinnamon has a more modern feeling, and is also developed by the Mint team, hence the most obvious choice. Both are good enough and with my low system resources on this laptop, the needed system resources is the most important factor to consider.

Result

Free RAM

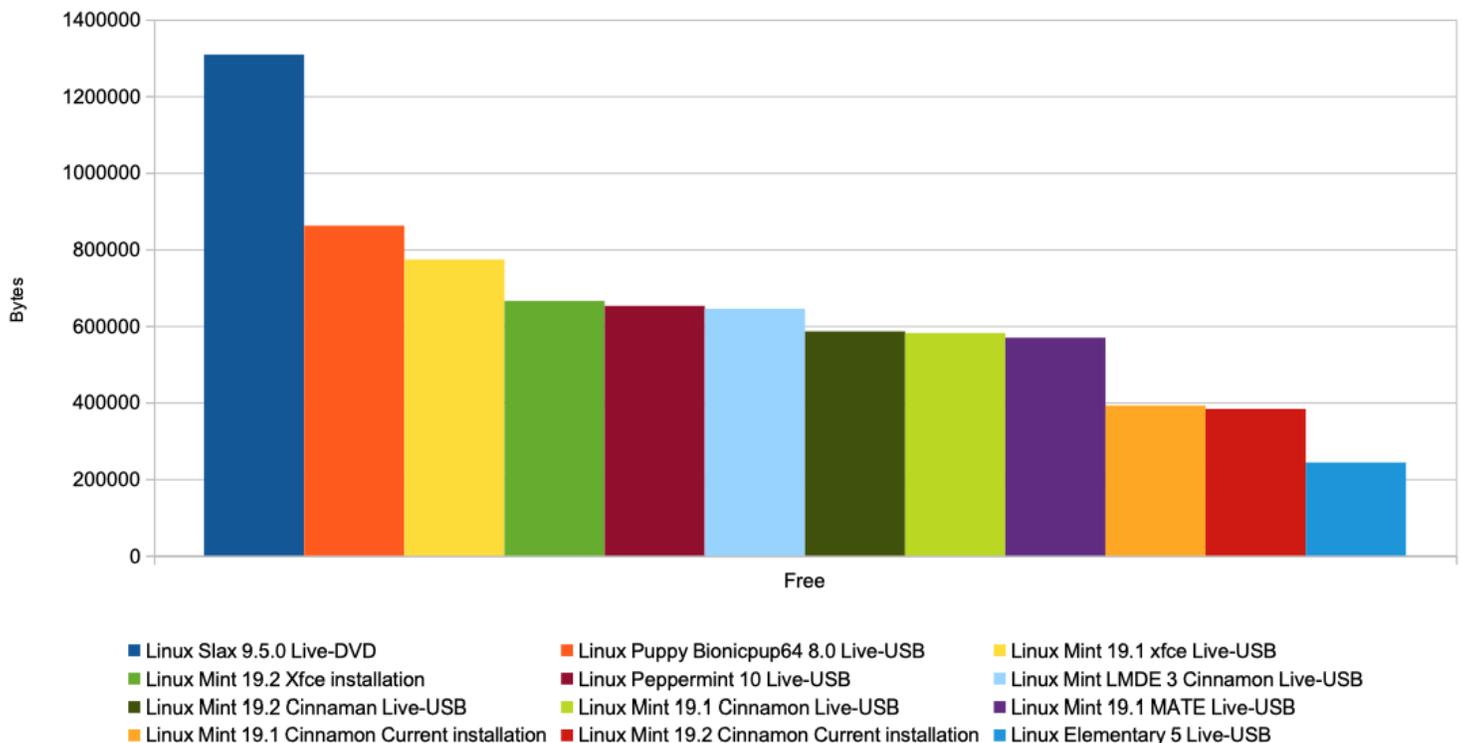


Chart over free RAM memory for the tested distros [graph: Henrik Hemrin]

Test result table

Distro	Free	Used	Buffer/ Cache
Slax 9.5.0	1 308 584	138 124	450 560
Puppy 8.0	861 500	124 312	902 988
Mint Xfce 19.1	773 172	343 760	769 392
Mint Xfce 19.2 Installed	664 908	607 384	614 128
Peppermint 10	652 116	300 288	933 692

Mint LMDE 3	644 504	535 432	717 256
Mint Cinnamon 19.2	585 604	493 456	807 232
Mint Cinnamon 19.1	581 328	497 328	807 668
Mint MATE 19.1	568 984	355 544	961 796
Mint Cin 19.1 Installed	391 676	786 216	708 400
Mint Cin 19.2 Installed	383 028	773 068	730 192
elementary 5	243 040	507 616	1 135 660

I have used the command “top” in a terminal window to get the result.

Discussion and some words about the distros

Slax is indeed the least memory hungry of them all, by far. It has extremely few applications in the installation. It has a Chromium web browser, and a few more things pre-installed. My feeling is that it is part of the idea, that the user always is online using cloud services.

Puppy comes next, and is more ”traditional” when it comes to pre-installed software. It has Pale Moon web browser.

Peppermint is not that very lightweight in this selection. I notice, Peppermint has Gmail, Google Drive, Google Calendar and Microsoft Office Online pre-installed. But not e.g. LibreOffice. Peppermint also target a more always on-line and cloud services user.

As I had expected, of the four Mint versions, Xfce is least memory consuming. Mint is a distro-family with a relatively complete portfolio of useful software included in the initial installation. I was surprised, that the LMDE version, with Cinnamon, came out as second of the Mint distributions, although well behind Xfce. The difference between LM 19.1 and 19.2 with Cinnamon is negligible.

The LMDE is a relatively new addition to the Mint family. It is a Mint project they have started to be prepared if Ubuntu one day will not be available any more. As I understand, LMDE is already fully usable. Ubuntu is a free open Linux distro, but it is owned by the commercial company Canonical. Actually right now, the **June issue of the official Linux Mint blog (<https://blog.linuxmint.com/?p=3766>)** writes about a concern with Ubuntu and their Snap library. It is a concern Snap may become mandatory to use, hence users of Ubuntu-based will then be in the hands of Ubuntu and Canonical. It may very well not happen, but it indeed makes the LMDE version even more interesting.

Finally, elementary required most RAM memory. It is what I expected. Elementary is a macOS look-alike distro. The state themselves as "Fast, open and privacy-respecting replacement for Windows and macOS". Although elementary is free to download, they have a different approach as they at the same time also ask for "pay as you want" before downloading. I understand it is the same when downloading applications. The other distros are free to download without question, but they generally have a request for donations.

Installed versions

When I compare my newly installed LM 19.2 Cinnamon to the previous installed LM 19.1 Cinnamon, it is not so easy to tell, it depends... I have saved three measurements values of free RAM: 73 736, 305 056 and 383 028. In the first measurement, Time shift software was running, which indeed took a share of the memory. To give a really correct comparison, I should review exactly what is running and using resources. It had been doable of course with e.g. deeper analyse of the top commande in the Terminal window - but in this article I wanted to stay at an easy level of analysing. I also know that Mint team states that needed memory resources depends on which graphics card is used. My little test, is too simple to establish a correct comparison between LM 19.1 and LM 19.2 installed versions.

Concluding for this laptop

This laptop, Lenovo ideapad 100s-14IBR; CPU: 1.60 GHz dual core, eMCC (SSD) Hard drive: 32 GB, RAM: 2 GB, is a secondary machine for me. My primary machine is a desktop Mac mini, running on latest macOS. I use this laptop typically:

- When I need a mobile machine
- To explore Linux and Linux applications, for general curiosity and knowledge, and learning for eventually switching to Linux as my primary operating system (on a more powerful machine)

Elementary is not relevant for this laptop, but still a distro I keep my eye on to eventually use in the future on a

better machine. All the other can be relevant, considering this laptop alone. My personal feeling is that Puppy and Mint are those I would prefer.

However, if I see this laptop as a Linux earning machine, I think I will stick to Mint, as it indeed is one of the distros I consider for an eventually coming primary machine. Linux Mint seems to be a Linux distro that "simply works" without hard efforts! Xfce is best of them when it comes to memory resources.

Henrik Hemrin

10 July 2019

Updated 4-5 August 2019 with Linux Mint 19.2

Updated 27 September 2019 with Linux Mint 19.2 Xfce installed.

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KevinP 4 veckor sedan

I read this 2021 :)

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Henrik Hemrin 4 veckor sedan

Thanks for reading, hoping it give you some insights and thoughts. It would be interesting to do a new comparison with latest version of some distros.

What I can tell is that I have Linux Mint 20.1 Xfce, i e latest version, installed on the drive. And it works. I do consider to change a even more low resource distro like Puppy to get a bit more power for applications. I am also tempted to try Haiku (not Linux) but haven't so far got it to boot correctly. But generally Mint feels as home and it works!

0 [Quote](#) [Reply](#)



Mariusz 3 veckor sedan

Nice article, I've been looking for such comparison but one thing bothers me. You said that elementary OS has highest RAM usage, but that's not true. As you can see in your Test result table, elementary uses just about 500MB, those in buffer is something like predicted need for programs to start faster - this means that you have faster system but in general it uses 500MB from very beginning to eventually allocate those buffered. On the other hand Linux Mint consumes up to 700MB right?

0 [Quote](#) [Reply](#)



Henrik Hemrin 3 veckor sedan

Hi Mariusz,

I believe you have a point there and I should consider to rewrite and conclude somewhat differently.

I must admit that I far from understand this fully. I think it is true to say it's better to have more of the resources in "buffer/cashe" than in "used".

I read the bash info for top command, but it does not really help me. I read further in some forums, but it is still not fully clear to me after a quick reading. It is a difference between "buffered" and

"cashe", and you do not see details in this table how much is "buffer" and "cashe" respectively.

To me it is not only to consider "used" memory for the comparison, but I agree to only compare "free" does not give the most correct comparison. Here are two forum threads:

(<https://unix.stackexchange.com/questions/390518/what-do-the-buff-cache-and-avail-mem-fields-in-top-mean>)unix.stackexchange.com/questions/390518/...m-fields-in-top-mean

(<https://unix.stackexchange.com/questions/390518/what-do-the-buff-cache-and-avail-mem-fields-in-top-mean>)

(<https://askubuntu.com/questions/198549/what-is-cached-in-the-top-command>)askubuntu.com/questions/198549/what-is-c...d-in-the-top-command (<https://askubuntu.com/questions/198549/what-is-cached-in-the-top-command>)

What do you think after reading those threads?

0 [Quote](#) [Reply](#)



Mariusz 3 dagar sedan

The topics You have mentioned made it clear.

Buffered memory is used for writing something like to save some changes made in memory to files on disk etc. and these will be free after the operation is done (should not be consider as used for long time term)

And Cached memory is something what is read from disk and might be used again if not changed from the source. These can be free at any time when needed, so You can consider it as free at any time.

As I wrote about buffer I meant all buffer/cashe and I was right about this cached (or cashed whatever) as it just made usual data being available faster for the user, but still free at the same time when memory would be needed.

That is very important and it shows that elementary OS has lower RAM usage and better predictions for app usages from very OS boot.

At the end I would add my opinion that all RAM should be used all the time, because it is it's purpose. If caching any data from disk to RAM would made users work faster then why shouldn't it be done? Remember that cached memory is still available whenever it's needed for "real" use of memory :)

0 [Quote](#) [Reply](#)



Henrik Hemrin Mindre än en minut sedan

Thanks Mariusz for your additional comment. I prepare for a major update of the article.

0 [Quote](#)

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