



USB Persistence

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Presentation for KWLUG



What is USB Persistence?

- A full Linux installation on a removable USB drive
- Allows updating the system and saving documents to the USB drive
- A portable environment you can boot on any PC available (Mostly)

Warnings for persistent USB

- Persistence is considered a TEST environment. Backup data and/or the whole drive regularly.
- Use USB 3.0 drive if available and the target computer supports USB 3.0. USB 2.0 is **SLOW**.
- USB thumbdrives are not considered “durable” and will fail after a number of write cycles. Many sources suggested an external HD or SSD for long term or regular use.

Things to note

- Consider storage size. A Mint install is about 11GB, Manjaro is smaller at a little more than 4GB.
- 2 USB drives are needed. 1 for the installer and one to be the target.
- Both Manjaro and Mint can create persistent drives from the bootable installer.
- Mint booted from a persistent USB drive was much slower than Manjaro. While still usable, a lot of patience is needed when booting and opening applications. Manjaro did not have an obvious slowdown.



Casper Partition vs. Persistent USB

- A Casper Partition is a separate writable data partition typically added to a bootable installation USB stick. This only allows for saving documents, not updating the system or adding applications. The Kernel and programs are not updatable without recreating the USB drive from a current installer.
- Persistent USB has a standard filesystem layout. This allows updating the Kernel, programs, and having a persistent home directory.

Mint Specific Warning

- When creating on a UEFI machine, be aware that the EFI bootloader entry MAY be overwritten. You should have a way to recreate on the machine if needed.
- In 3 of 4 attempts to install Mint to a USB drive, the bootloader was rewritten on the host PC's internal disk. I have not found a reliable method for installing Mint that did not break the existing install on the host PC.
- You have to take into account if the target PC will be a BIOS or UEFI install. Also what type the PC you create the installer from. By default a BIOS-based PC will create a BIOS-based USB with an MBR partition table. A UEFI-based PC will create a UEFI-based USB with a GPT partition table.



Manjaro

- Manjaro adds both BIOS and UEFI/GPT bootloaders to the drive. I have booted a machine in both modes, when booted as BIOS there is no `/sys/firmware/efi/` directory.
- There is a specific tool I found for creating a persistent environment for Arch-based distros, ALMA – the Arch Linux Mobile Appliance. ALMA can also create disk images that you can boot and interact with via Qemu.



Mint

- Found 2 methods to create a persistent Mint USB install. Method 1 uses the Mint installer to do a full install to a USB drive, method 2 takes the Mint installer ISO, copies it to USB with persistence. Both can be updated, but the second method appears to be less flexible as it is based on the installer.

Mint - Install to USB

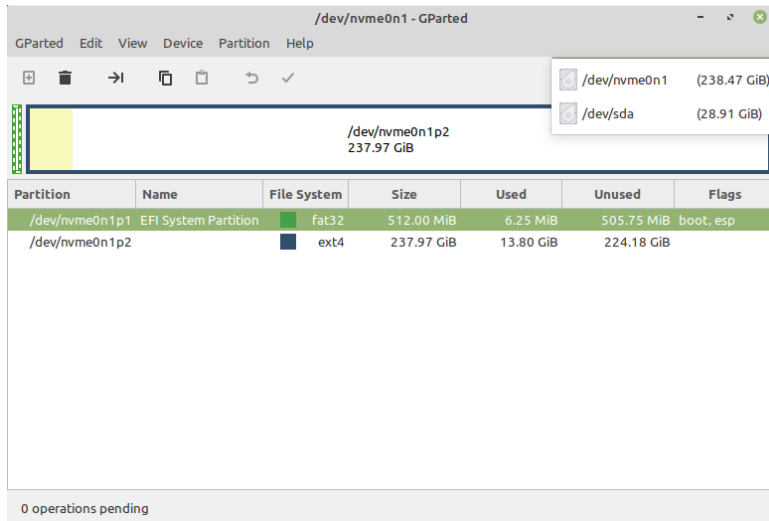
- Method 1 is how the bootloader was overwritten on the PC's internal drive. To avoid this, Gparted is used to deselect the boot and esp flags on the internal drive while installing to USB. The flags need to be manually restored after the install is complete. This didn't work in 3 of 4 attempts. Perhaps removing the internal drive while installing would be safer, but the installer still may change the default boot device in the PC's EFI settings.
- <https://learnlinuxandlibreoffice.org/2-linux-to-the-rescue/2-3-create-a-usb-stick-with-persistent-storage>

Mint - mkusb

- Method 2 uses an application called mkusb added from an Ubuntu official PPA and should work for Ubuntu based distributions. Still creates a casper partition, but updates can be applied and are persistent. I had problems with video drivers across multiple machines.
- <https://www.linuxuprising.com/2019/03/create-persistent-storage-live-usb-with.html>
- <https://help.ubuntu.com/community/mkusb/>

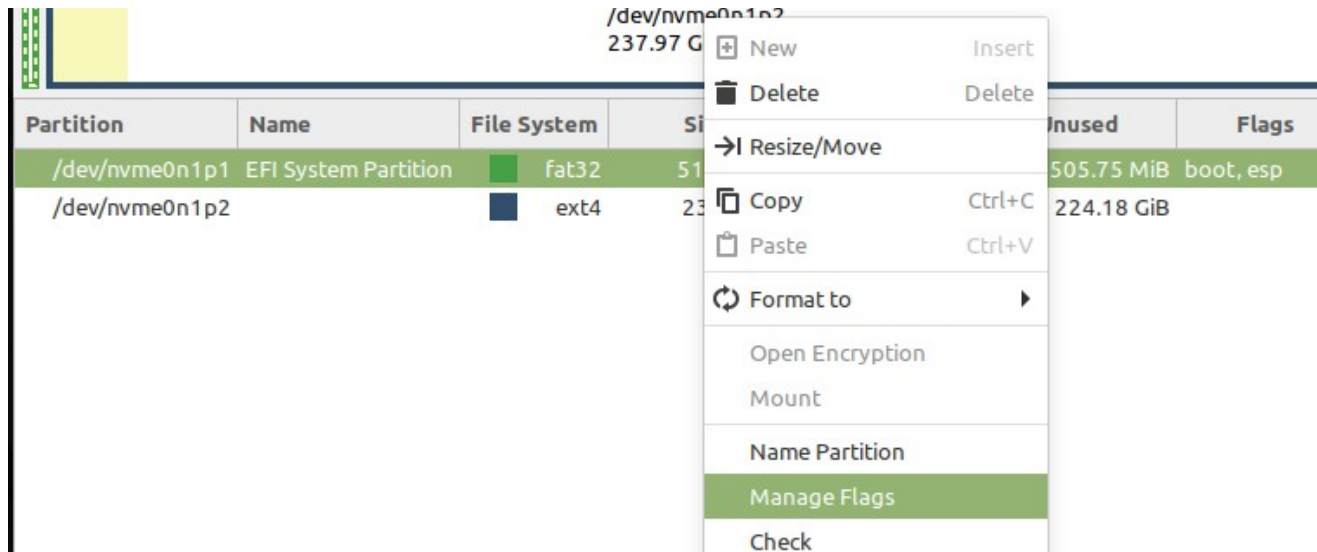
Mint Installation, Gparted example

- Create a Mint install USB and boot from it. Once the desktop appears, connect USB that will have the Persistent install.
- From the launcher open Gparted under Administration.
- In the top right drop down menu, select the internal disk:



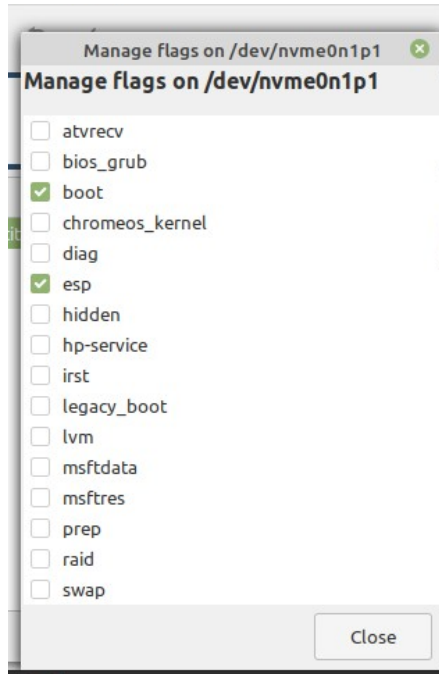
Mint Installation, Gparted example

- Right-Click EFI System Partition, Click Manage Flags



Mint Installation, Gparted example

- Clear the esp and boot flags.



Mint Installation, Gparted example

- Start the Mint installer, pay attention to the drive details and install to the USB stick.
- Once the install is finished open Gparted again, select the internal disk and reset the boot and esp flags. At this point, remove both the intaller and persistent USB disks and reboot the PC to confirm the bootloader is still functioning. Fix if needed, refer to your distro's help?
- Your persistent USB can now be booted, you will have to use the PC's boot options to choose the persistent USB disk.



Mint Installation

- You can now use the persistent USB as a normal install, adding applications, updating the system and applications, saving documents, etc.
- Remember to back up any important data regularly.

Manjaro Installation

- Uses an application called ALMA – Arch Linux Mobile Appliance to create the live environment.
 - <https://github.com/r-darwish/alma>
 - <https://github.com/philmmanjaro/alma>
- ALMA can create the live environment on a USB drive or a disk image, supports both BIOS and EFI machines.
- Presets can be configured using TOML files to automate install
 - add users, install window manager, run post-install scripts.The TOML files are described on the github page.

Manjaro Installation

- Uses LTS kernel, which does mean fewer kernel updates. I did update the kernel without any issues.
- Can chroot into the install and have full access to the system, allowing for offline updates.
- Disk images can be booted in qemu.
- Can create from Manjaro install environment.
- Root user has no password. Set root password on first boot!
 - Login as root, \$ passwd

Manjaro USB Install

- Boot from Manjaro USB installer, the following creates user “usb”, prompts for user password and installs xfce with Manjaro customizations.
- `$ sudo pacman -Sy alma-git`
- `$ cd Documents`
- `$ git clone https://github.com/philmmanjaro/alma.git`
- `$ sudo ALMA_USER=usb alma create /dev/disk/by-id/usb-<Some Unique Disk ID, Tab autocomplete works here>0\:0 – presets ./alma/presets/xfce-manjaro`

Manjaro Disk Image

- Create image: `$ sudo alma create -image 10GB almatest.img`
- Mount on loop device: `$ sudo losetup -f <path to image file>`
- Check loop device: `$ sudo losetup -j <path to image file>`
 - Returns something like: `/dev/loop0: [2050]:1843998 <path to image file>`
- Boot in Qemu: `$ sudo alma qemu /dev/loop0`



Demo

- .toml files
- Qemu boot image
- USB boot of Manjaro