# Mounting a USB Flash drive or DVD to CentOS (Optional)

## \*\*\*Questions you need to hand in are marked with \*\*\*

The CentOS workstation will probably mount a flash drive automatically once it is connected. However, we must tell VMware Player to connect the flash drive to the virtual machine. Use Player > Removable Devices > flash drive name > Connect. When you do that it will automatically appear on your desktop.

While graphical desktops often mount devices automatically, many console-only servers do not. It is good to know how to mount devices using the command line. Additionally, it aids in understanding how drives connect to the file system.

Connect a flash drive to your VM and make sure it appears on your desktop.

From a terminal, type the command df. It will show you the devices that are mounted. You should see the name of your flash drive in the right-hand column, for example run/media/john/FD-SETUP. The left-hand column shows where Linux thinks the flash drive is physically located, /dev/sdb1 in my case.

[john@localhost ~]$ df

Filesystem 1K-blocks Used Available Use% Mounted on

/dev/mapper/centos-root 17811456 3411916 14399540 20% /

devtmpfs 2065424 0 2065424 0% /dev

tmpfs 2081132 0 2081132 0% /dev/shm

tmpfs 2081132 9268 2071864 1% /run

tmpfs 2081132 0 2081132 0% /sys/fs/cgroup

/dev/sda1 1038336 239676 798660 24% /boot

tmpfs 416228 8 416220 1% /run/user/42

tmpfs 416228 36 416192 1% /run/user/1000

/dev/sdb1 523856 437336 86520 84% /run/media/john/FD-SETUP

The right-hand column shows where the flash drive is mounted, which is where you can access the flash drive in the file system. You can us ls to see the contents of your flash drive:

ls -l /run/media/john/FD-SETUP (the path will be different for you)

Let's unmount the flash drive. We’re using sudo here because normally only root is allowed to connect drives. Sometimes the /etc/sudoers file is edited allow any user to mount and unmount devices.

[john@localhost ~]$ sudo umount /run/media/john/FD-SETUP/ (or your path)

The flash drive should disappear from your desktop, and ls /run/media/john/FD-SETUP (or whatever) should no longer work.

We know the drive is actually located at /dev/sdb1, but that's because we cheated--we looked while the drive was already mounted. If you don't know where the drive is, fdisk -l (lower case L) can help:

[john@localhost ~]$ sudo fdisk -l

Disk /dev/sda: 21.5 GB, 21474836480 bytes, 41943040 sectors

Units = sectors of 1 \* 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk label type: dos

Disk identifier: 0x00013caa

Device Boot Start End Blocks Id System

/dev/sda1 \* 2048 2099199 1048576 83 Linux

/dev/sda2 2099200 41943039 19921920 8e Linux LVM

Disk /dev/mapper/centos-root: 18.2 GB, 18249416704 bytes, 35643392 sectors

Units = sectors of 1 \* 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/mapper/centos-swap: 2147 MB, 2147483648 bytes, 4194304 sectors

Units = sectors of 1 \* 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/sdb: 15.5 GB, 15502147584 bytes, 30277632 sectors

Units = sectors of 1 \* 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk label type: dos

Disk identifier: 0x50a05a87

Device Boot Start End Blocks Id System

/dev/sdb1 \* 63 1048319 524128+ 6 FAT16

On my machine, the existing Linux drive is sda, and the partitions are sda1 and sda2. At the bottom, there's a new drive that wasn't there before, sdb1. Also, it's format is FAT, which is common for smaller flash drives.

\*\*\*What is the device location for the flash drive on your VM? (/dev/sd\_\_)

\*\*\*What is the format used by your flash drive?

Now, let's make a directory where we want the flash drive to appear, i.e., where we will mount it. I'll call mine flash:

[john@localhost ~]$ ls /

bin dev home lib64 mnt proc run srv tmp var

boot etc lib media opt root sbin sys usr

[john@localhost ~]$ ls /media

[john@localhost ~]$ sudo mkdir /media/flash

Note: you don't have to make this be in the /media directory. However, it's common practice to put mounted devices in /media or /mount.

Now mount the drive. On my system we mount /dev/sdb1 to /media/flash. On yours, the flash drive may be in a different location, which you saw in fdisk -l.

[john@localhost ~]$ sudo mount /dev/sdb1 /media/flash

[john@localhost ~]$ df

Filesystem 1K-blocks Used Available Use% Mounted on

/dev/mapper/centos-root 17811456 3411884 14399572 20% /

devtmpfs 2065424 0 2065424 0% /dev

tmpfs 2081132 0 2081132 0% /dev/shm

tmpfs 2081132 9264 2071868 1% /run

tmpfs 2081132 0 2081132 0% /sys/fs/cgroup

/dev/sda1 1038336 239676 798660 24% /boot

tmpfs 416228 8 416220 1% /run/user/42

tmpfs 416228 28 416200 1% /run/user/1000

/dev/sdb1 523856 437336 86520 84% /media/flash

Linux can often determine the format of the drive on its own, as it does in this case. If it can't you will have to specify it using the -t option. Since this drive is FAT32, we would use:  
sudo mount -t vfat /dev/sdb1 /media/flash  
If your flash drive has another file system, you may be able to discover the code to use for the -t option with sudo parted -l or sudo file -sL /dev/sdxx (sdb1 in this case.)

\*\*\*What commands did you use to locate and mount your flash drive?

\*\*\*Using the information in the df output, draw a picture of the directory tree and show where the partitions are mounted.

Note: The OS will often cache information that will be written to disk in memory (buffer) for a while, and then write it to disk when convenient. Before you physically remove a device like a flash drive, it is good to unmount it first to ensure the buffers have been written. From the GUI, you can right-click the flash drive and select "eject" or "safely remove" to do this.