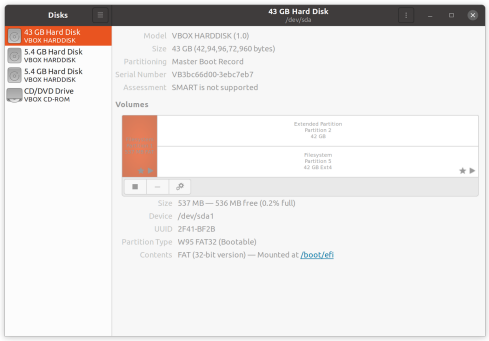
Notes:

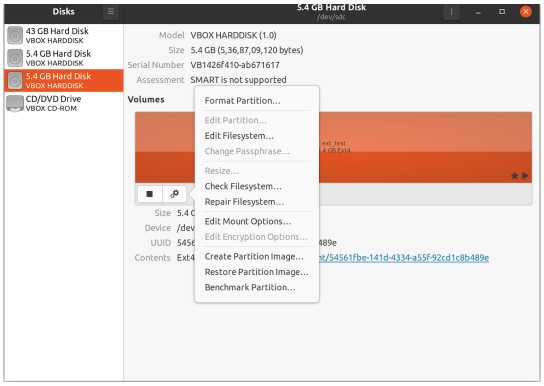
1. **Our output folders for every test are available in the "Outputs" folder submitted in this zip file.**
2. **ZFS and ext4 File Systems have been used.**
3. **Both the partitions/disks (ZFS and ext4) should be at least 5 GB in size.**
4. **If you face difficulty with any step, feel free to contact us.**

Installation:

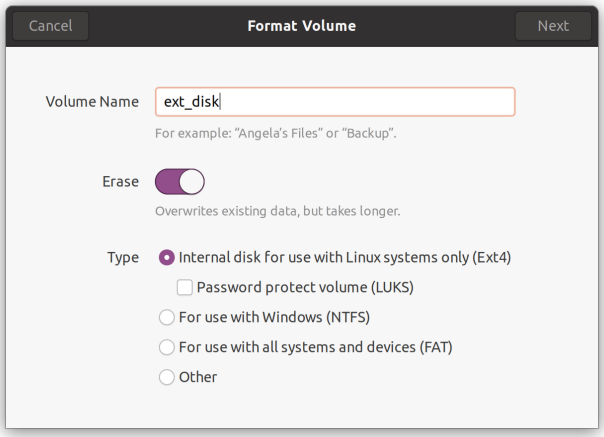
1. **ZFS:**
    a. First install the ZFS filesystem with:
    `sudo apt install zfsutils-linux -y`
    b. Choose a disk among installed disks (**NOTE: THIS DISK MUST BE OF AT LEAST 5 GB IN SIZE**). Also, don't use the disks being used by the system (sda in my case).
    You can list the disks using: `sudo fdisk -l`
    c. Once you have picked the disk (**Let's say the chosen disk is /dev/sdb**), create a ZFS pool named "zfs_pool" using the following command:
    `sudo zpool create zfs_pool /dev/sdb`
    d. **Switch deduplication on for the newly created zfs pool:**
    `sudo zfs set dedup=on zfs_pool`
    e. Now, you will be able to find the directory /zfs_pool in the root directory. **This is going to be the anchor for running the workloads.**
2. **ext4**
    a. ext4 is preinstalled and the default file system on Ubuntu. The following instructions tell you how to format a disk and set up the ext4 filesystem on it.
    b. Open the Application "Disks":



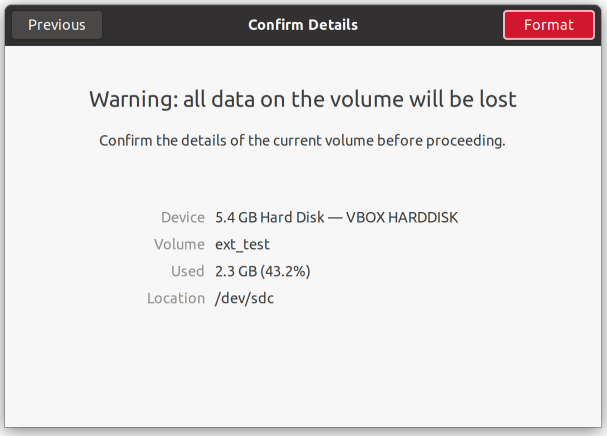
    c. Choose the disk you want (**SHOULD HAVE AT LEAST 5 GB DISK SPACE**) and click the "Gear" icon. Then choose "**Format Partition**":



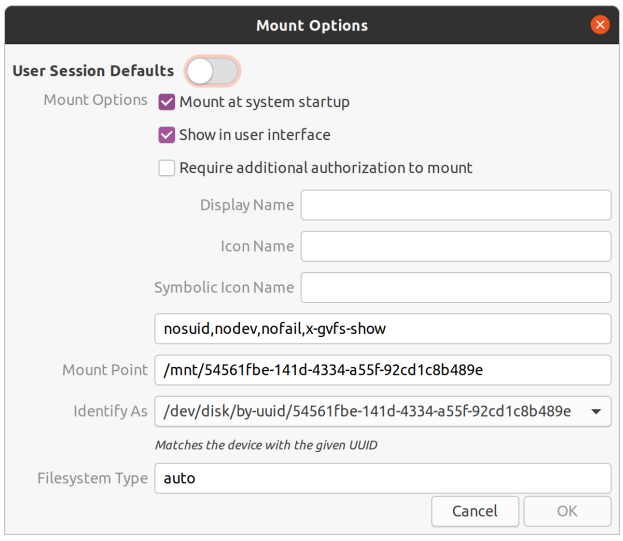
d. Then, choose a name for the new disk and choose the Ext4 option (first option in my computer). Check the “Erase” switch. Then click next:



e. Then Select “Format”:

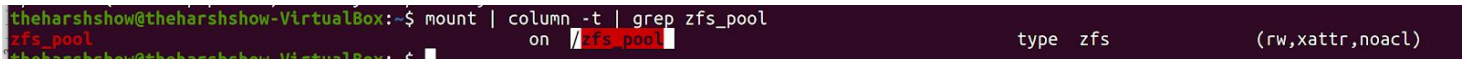


f. Once the disk is formatted, make sure that the disk is mounted. If not, then open “mount options” for the disk (Gear Icon->Edit Mount Options) and then uncheck “User Session Defaults” and check “Mount on system startup”. Then Reboot:

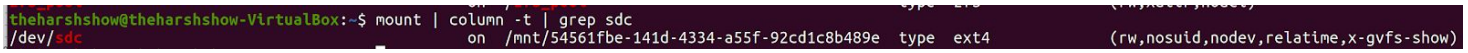


Finding the anchors:

1. In order to run the workloads on ZFS/ext4 partitions, you need to find the anchors corresponding to the partitions. This is how you do it:
    a. Let's say you have a ZFS pool (named zfs_pool) for which you want to find the anchor. This is how you do it:



    b. The highlighted part (/zfs_pool) is the anchor.
    c. In my case, the ext4 drive was mounted with the name "/dev/sdc":

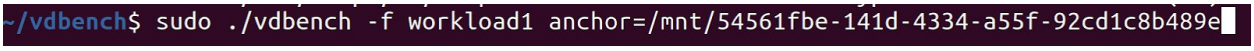


    d. Here, "/mnt/54561fbe-141d-4334-a55f-92cd1c8b489e" is the anchor.
2. **Finding the anchor is extremely important because without it, our workloads won't work.**

Running workloads on the two File Systems:

1. Add both the workload files (**workload1** and **workload2**) to your **vdbench** directory.
2. Navigate (cd) to your vdbench directory in the terminal.
3. Run commands:
    a. In order to run workload1 on your ZFS partition, run the workload using the following command (**SUBSTITUTE IN YOUR ZFS ANCHOR INSTEAD OF zfs_pool**):

    b. Likewise, in order to run workload1 on your ext4 partition, s**ubstitute in your ext4 anchor** instead of /mnt/54561fbe-141d-4334-a55f-92cd1c8b489e in the following command:



    c. Likewise, in order to run **workload2,** substitute **workload2** instead of **workload1** in the above commands.

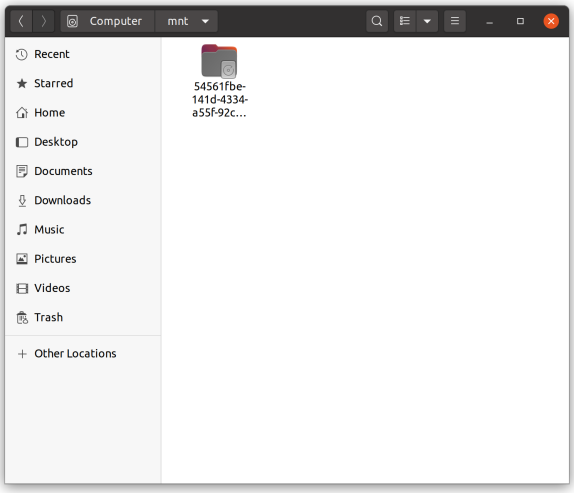
Viewing stats:

1. You can view the summary for the last workload run in the **summary.html** file in the **Output** folder in the vdbench directory.
2. In order to monitor the space taken by the file systems before and after running workload:
    a. For **ZFS:**
        i. Run the following command: `zpool list`
        ii. Here's a sample output:

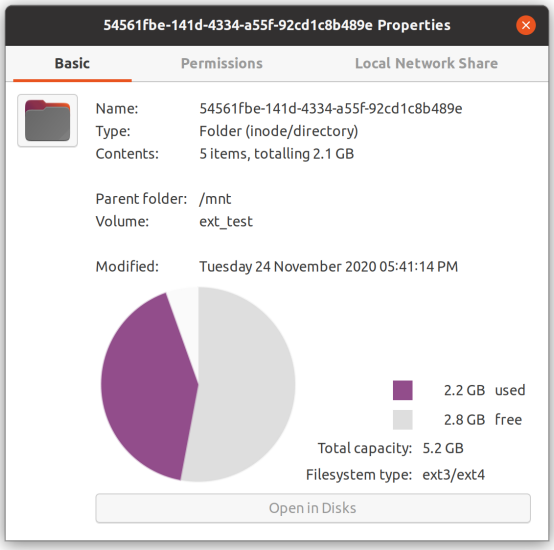
iii. Run this before and after running the workload in order to calculate space taken by the files after the workload. (Calculation done in report)

b. For **ext4:**

i. Navigate to the folder containing the ext4 anchor in the GUI File manager for Ubuntu. In my case, the anchor is "/mnt/54561fbe-141d-4334-a55f-92cd1c8b489e". Thus, I navigated to /mnt:



ii. Then right click and view the properties of the anchor folder. Here you can see the space taken:



Happy Holidays :)