#316860 - Expand Storage with Logical Volumes on opensuse.example.com

Objective:

This task requires you to create and manage storage using LVM in OpenSUSE.

Scenario:

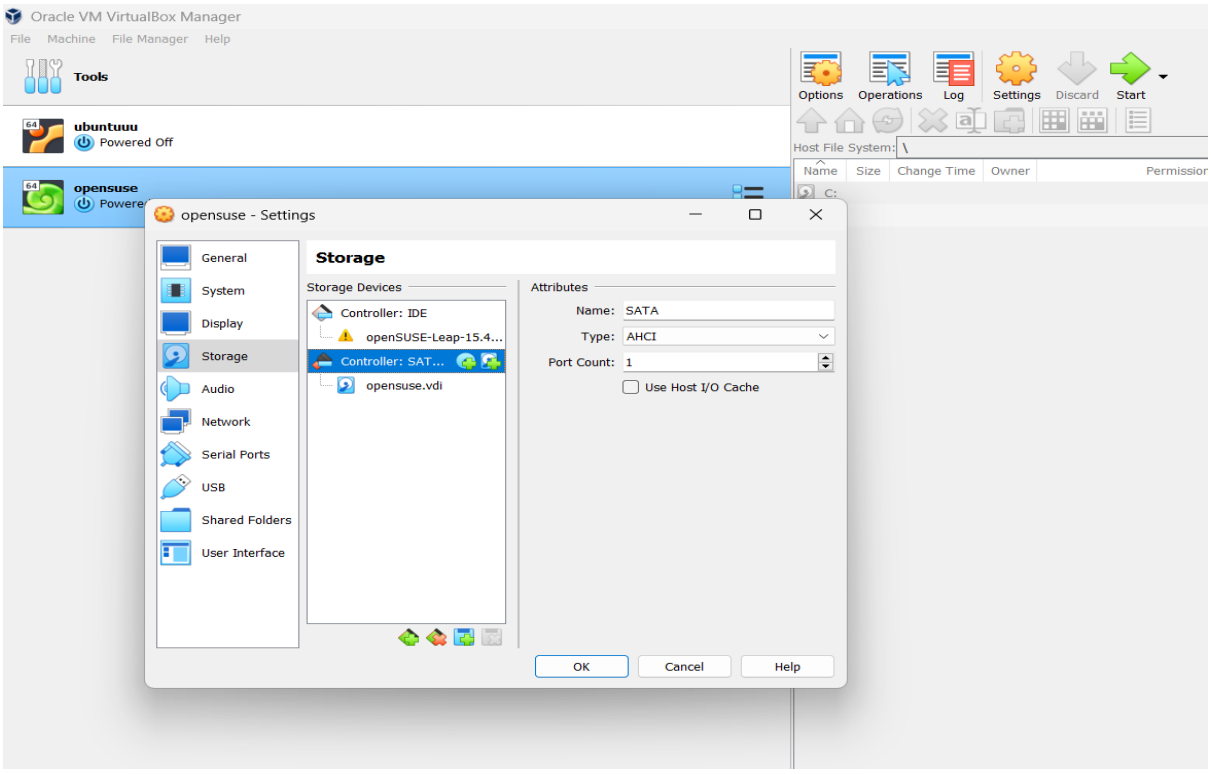
Your OpenSUSE virtual machine requires additional storage. You need to provision the storage by adding new disks, creating a VG, and provisioning LVs to meet your storage needs.

Constraints:

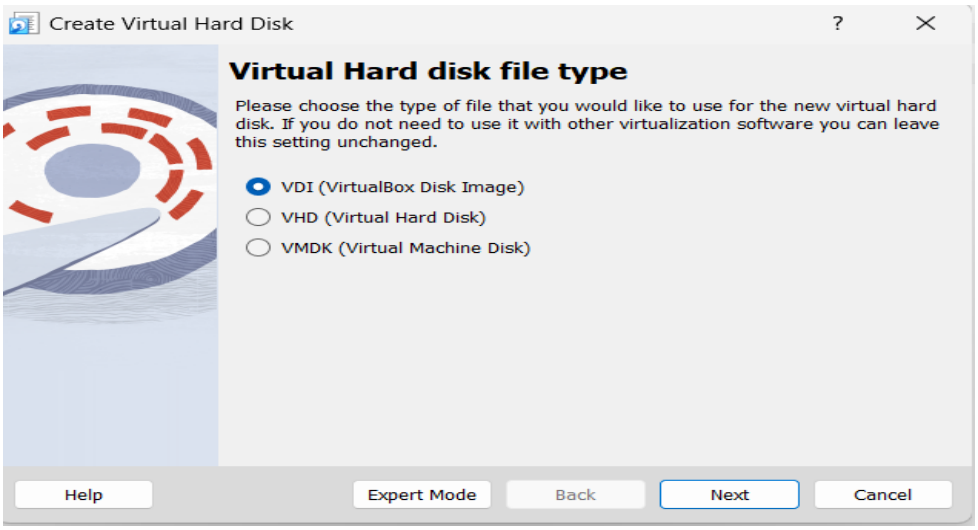
- Add two disks of size 2GB and 3GB respectively to your opensuse.example.com machine.
- Create a VG named vg_data of size 5GB.
- Create two LV's of size 1.5GB and 2GB with names lv1 and lv2 respectively.
- And mount lv1 persistently to directory '/mnt/app1_data'. And mount lv2 persistently to directory '/mnt/test_data'.

Add Disks to the Virtual Machine

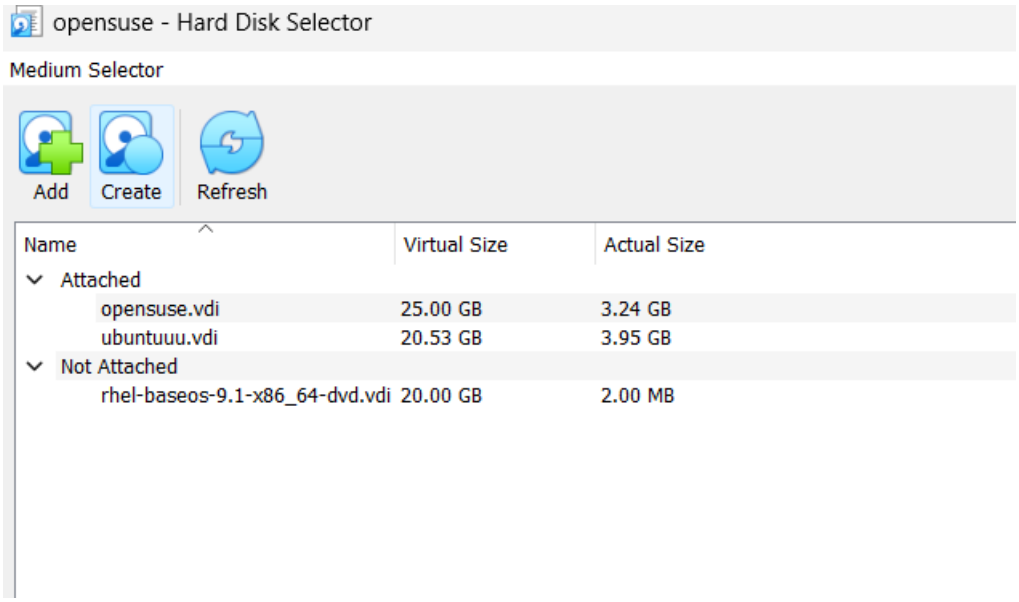
- Open Oracle VM Virtual Box Manager, select the Virtual Box for which you want to add the new disk and click on settings
- Click on Storage, select hard drive and click on Add a hard disk.



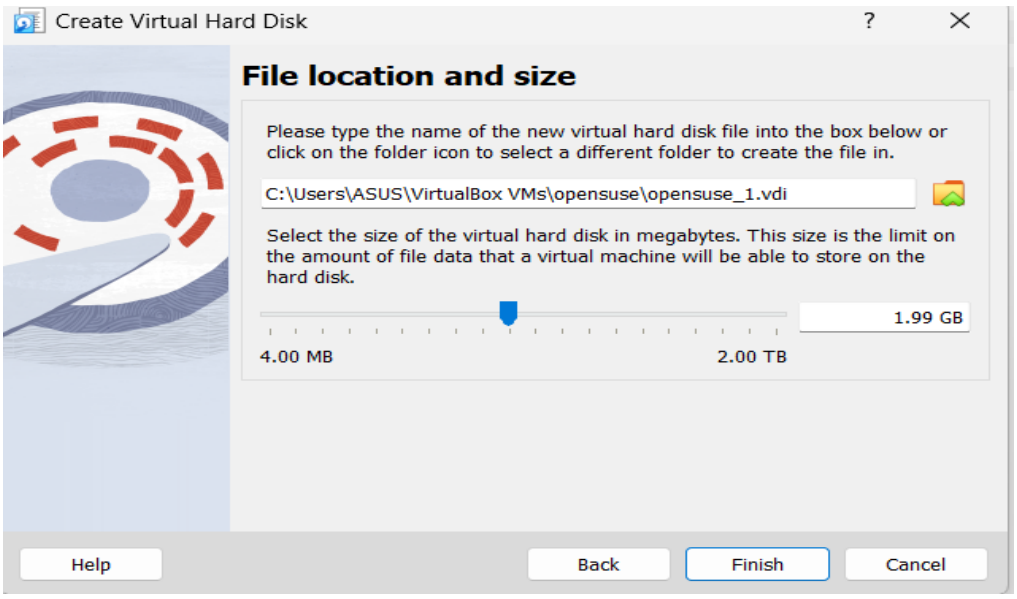
Select VDI (VirtualBox Disk Image) and click Next



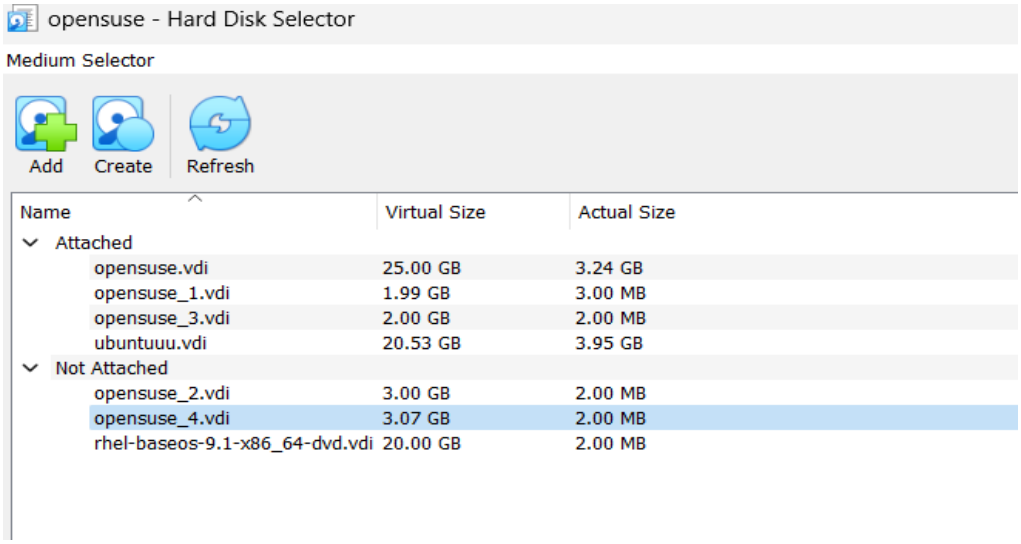
- **Click on Create.**



Enter the size of disk 2GB and create another disk of size 3GB



Now choose both disk one by one.



- Disk added successfully.

Now Start OpenSUSE:

- To check disks, enter command "lsblk"

```
opensuse:~ # lsblk
NAME   MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
sda      8:0    0   25G  0 disk
├─sda1   8:1    0    8M  0 part
└─sda2   8:2    0   23G  0 part /tmp
                                /usr/local
                                /var
                                /srv
                                /root
                                /opt
                                /boot/grub2/i386-pc
                                /home
                                /boot/grub2/x86_64-efi
                                /.snapshots
                                /
└─sda3   8:3    0    2G  0 part [SWAP]
sdb      8:16   0    2G  0 disk
sdc      8:32   0    2G  0 disk
sdd      8:48   0    3G  0 disk
sr0     11:0    1 1024M  0 rom
opensuse:~ #
```

- Create Physical Volume. Attach both disk to volume.
- Then check created physical Volume with command "pvs"

```
opensuse:~ # pvcreate /dev/sdc /dev/sdd
  Physical volume "/dev/sdc" successfully created.
  Physical volume "/dev/sdd" successfully created.
opensuse:~ # pvs
  PV         VG      Fmt  Attr PSize PFree
  /dev/sdb   vg_data lvm2 a--  1.98g 1.98g
  /dev/sdc           lvm2 ---  2.00g 2.00g
  /dev/sdd           lvm2 ---  3.00g 3.00g
opensuse:~ #
```

- Create Volume Group “vg_data” of size 5GB.
- Check the size of the volume group using command “vgs”.


```
opensuse:~ # pvcreate /dev/sdc /dev/sdd
  Physical volume "/dev/sdc" successfully created.
  Physical volume "/dev/sdd" successfully created.
opensuse:~ # pvs
  PV         VG      Fmt  Attr PSize PFree
  /dev/sdb   vg_data lvm2 a--  1.98g 1.98g
  /dev/sdc           lvm2 ---  2.00g 2.00g
  /dev/sdd           lvm2 ---  3.00g 3.00g
opensuse:~ #
```


- Create logical volumes lv1 and lv2 with size 1.5Gb and 2gb.
- Check the size of the logical volume using command “lvs”

```
opensuse:~ # lvcreate -L 1.5G --name lv1 vg_data
  Logical volume "lv1" created.
opensuse:~ # lvcreate -L 2G --name lv2 vg_data
  Logical volume "lv2" created.
opensuse:~ # lvs
  LV   VG      Attr       LSize Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert
  lv1  vg_data -wi-a----- 1.50g
  lv2  vg_data -wi-a----- 2.00g
opensuse:~ # _
```

Format both logical volumes with a filesystem ext4.

```
opensuse:~ # mkfs.ext4 /dev/vg_data/lv1
mke2fs 1.46.4 (18-Aug-2021)
Creating filesystem with 393216 4k blocks and 98304 inodes
Filesystem UUID: d1188c32-7c4e-4d93-aec3-b03d644d6d4b
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912

Allocating group tables: done
Writing inode tables: done
Creating journal (8192 blocks): done
Writing superblocks and filesystem accounting information: done
```

```
opensuse:~ # mkfs.ext4 /dev/vg_data/lv2
```

```
Creating filesystem with 393216 4k blocks and 98304 inodes
Filesystem UUID: d1188c32-7c4e-4d93-aec3-b03d644d6d4b
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912

Allocating group tables: done
Writing inode tables: done
Creating journal (8192 blocks): done
Writing superblocks and filesystem accounting information: done
```

- After formatting the filesystem, both logical volumes (LVs) get unique UUIDs. Check them with the command "blkid".
  - Blkid /dev/vg_data/lv1
  - Blkid /dev/vg_data/lv2

```
opensuse:~ # blkid /dev/vg_data/lv1
/dev/vg_data/lv1: UUID="dbdf7122-12ca-48fe-abfa-05756a8cc6ed" TYPE="ext4"
opensuse:~ # blkid /dev/vg_data/lv2
/dev/vg_data/lv2: UUID="b930ceee-0fac-40df-add3-0740ae298c9a" TYPE="ext4"
```

- Edit the /etc/fstab file to make the mount persistent.
- Enter UUID, mountpoint of lv1 and lv2.

```
UUID=dbdf7122-12ca-48fe-abfa-05756a8cc6ed /mnt/app1_data ext4 defaults 0 0

UUID=b930ceee-0fac-40df-add3-0740ae298c9a /mnt/test_data ext4 defaults 0 0
```

- Mount all filesystem mentioned in /etc/fstab with command “mount -a”.
- Now check lv1 and lv2 mounted successfully using command “df -hT”

```
opensuse:~ # mount -a
opensuse:~ # df -hT
Filesystem              Type      Size  Used Avail Use% Mounted on
devtmpfs                devtmpfs  986M  8.0K  986M   1% /dev
tmpfs                   tmpfs     994M     0  994M   0% /dev/shm
tmpfs                   tmpfs     994M   18M  977M   2% /run
tmpfs                   tmpfs     994M     0  994M   0% /sys/fs/cgroup
/dev/sda2               btrfs      17G  2.4G   15G  15% /
/dev/sda2               btrfs      17G  2.4G   15G  15% /boot/grub2/i386-pc
/dev/sda2               btrfs      17G  2.4G   15G  15% /boot/grub2/x86_64-efi
/dev/sda2               btrfs      17G  2.4G   15G  15% /root
/dev/sda2               btrfs      17G  2.4G   15G  15% /srv
/dev/sda2               btrfs      17G  2.4G   15G  15% /tmp
/dev/sda2               btrfs      17G  2.4G   15G  15% /opt
/dev/sda2               btrfs      17G  2.4G   15G  15% /usr/local
/dev/sda2               btrfs      17G  2.4G   15G  15% /.snapshots
/dev/sda2               btrfs      17G  2.4G   15G  15% /var
/dev/sda3               xfs        12G   44M   12G   1% /home
tmpfs                   tmpfs     199M     0  199M   0% /run/user/0
/dev/mapper/vg_data-lv1 ext4      1.5G  4.5M  1.4G   1% /mnt/app1_data
/dev/mapper/vg_data-lv2 ext4      2.0G  6.0M  1.8G   1% /mnt/test_data
```

Thank You

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