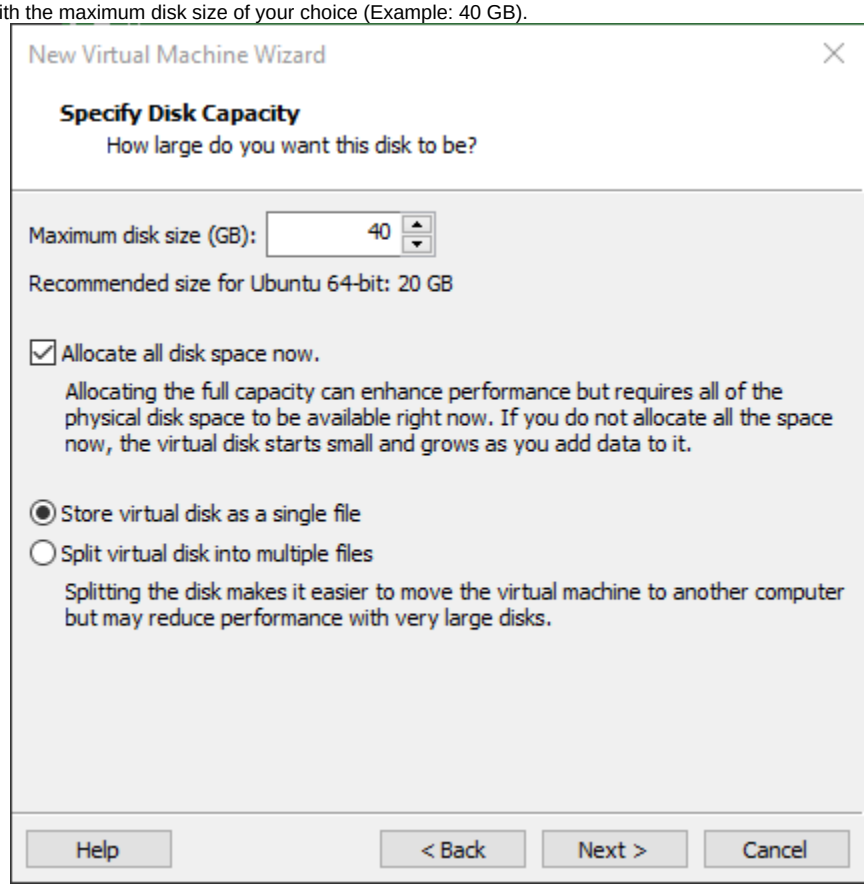
How to Increase/Extend the Ubuntu Server LVM Volume with LUKS (VMWare)

How to Increase/Extend the Ubuntu Server LVM Volume with LUKS (VMWare) - Table of Contents

Creating the Ubuntu Server VM

Follow this section, if you have not created the Ubuntu Server Virtual Machine yet.

1. Create a new Ubuntu Server 20.04 virtual machine in VMWare, with the options "Store virtual disk as a single file", "Allocate all disk space now", along with the maximum disk size of your choice (Example: 40 GB).

a. 

Setting-up the New Ubuntu Server VM

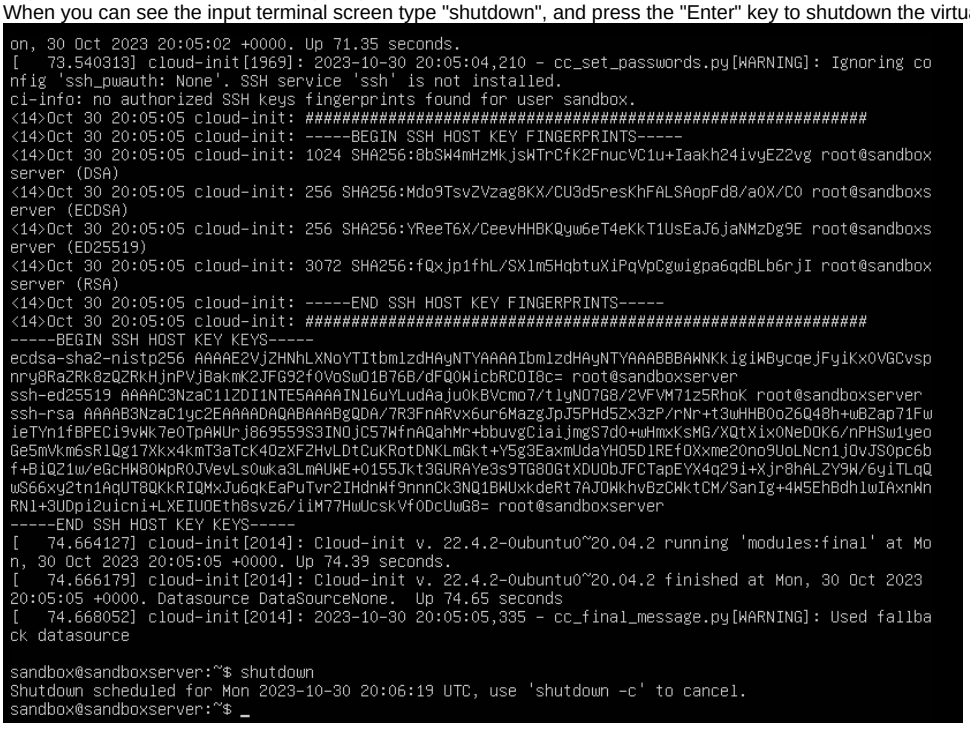
Follow this section, if you did not setup the Ubuntu Server Virtual Machine yet.

1. During the Ubuntu 20.04 Server installation, for the "Guided storage configuration" part, make sure "Use an entire disk", "Set up this disk as an LVM group", and "Encrypt the LVM group with LUKS" are selected, and enter a "Passphrase" for the LUKS Encryption.

a.

2. Go though the rest of the Ubuntu Server 20.04 setup as normal.
    a. After the Ubuntu Server 20.04 setup has completed, select "Reboot Now" and hit the "Enter" key.
    b. After restarting the virtual machine, unlock the disk.
    c. Log-in to the virtual machine when prompted.
    d. When you can see the input terminal screen type "shutdown", and press the "Enter" key to shutdown the virtual machine.

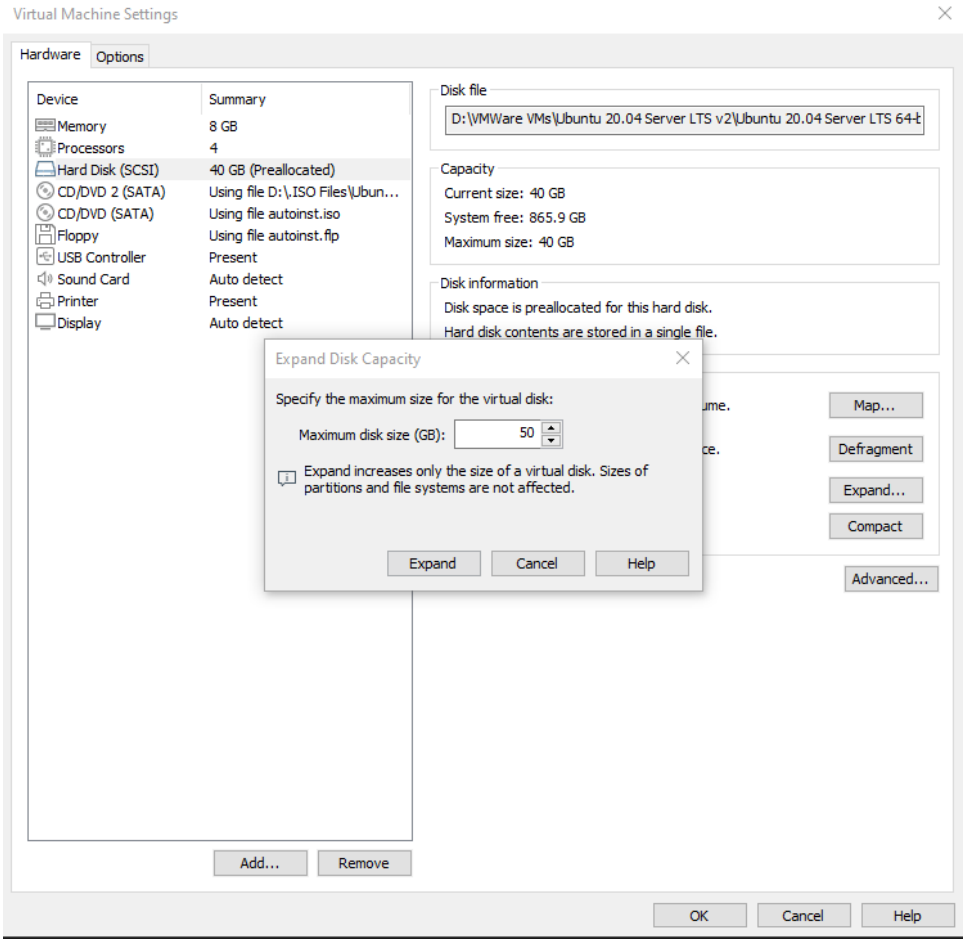
e.



How to Increase/Extend the Ubuntu Server LVM Volume with LUKS (VMWare)

Follow this section after you have created, and setup, the Ubuntu Server Virtual Machine.

1. While the virtual machine is shutdown, right-click the virtual machine's name on the left-hand side, and click "Settings..."
    a. Click on "Hard Disk"
    b. Under "Disk utilities", click "Expand..."
    c. Type your new desired maximum disk side, and click "Expand".
        i. Example (Part 1): If the VM was created with a 40 GB disk, you would enter in 40 + # GB
        ii. Example (Part 2): 50.0 GB would extend the drive by 10.0 GB



d.

2. After the disk has finished expanding, click "OK", click "OK", and click "Power on this virtual machine".
    a. After powering on the virtual machine, unlock the disk.
    b. Log-in to the virtual machine when prompted.
3. When you can see the input terminal screen type **lsblk**, and press the "Enter" key to view all of the drive partitions, and their mountpoints.
    a. Make note of the "NAME"s of the parent drives, for the root "/" drive.
    b. Example: **sda_sda3_dm_crypt-0_ubuntu--vg-ubuntu--lv**

```
sandbox@sandboxserver:~$ lsblk
NAME                      MAJ:MIN RM  SIZE RO TYPE  MOUNTPOINT
fd0                         2:0    1  1.4M  0 disk
loop0                       7:0    0 63.3M  1 loop  /snap/core20/1828
loop1                       7:1    0 91.9M  1 loop  /snap/lxd/24061
loop2                       7:2    0 49.9M  1 loop  /snap/snapd/18357
sda                         8:0    0   50G  0 disk
├─sda1                      8:1    0    1M  0 part
├─sda2                      8:2    0    2G  0 part  /boot
└─sda3                      8:3    0   38G  0 part
  └─dm_crypt-0            253:0    0   38G  0 crypt
    └─ubuntu--vg-ubuntu--lv 253:1    0   19G  0 lvm   /
sr0                        11:0    1 99.4M  0 rom
sr1                        11:1    1  1.4G  0 rom
sandbox@sandboxserver:~$ _
```

c.

4. Type in the command, "sudo growpart /dev/sda <sda #>", and press the "Enter" key.
    a. Example: **sudo growpart /dev/sda 3**
    b. Type in the **lsblk** command again, and press enter to make sure that the corresponding "sda#" has actually increased in size.

```
sandbox@sandboxserver:~$ sudo growpart /dev/sda 3
[sudo] password for sandbox:
CHANGED: partition=3 start=4198400 old: size=79685632 end=83884032 new: size=100659167 end=104857567
sandbox@sandboxserver:~$ lsblk
NAME                      MAJ:MIN RM  SIZE RO TYPE  MOUNTPOINT
fd0                         2:0    1  1.4M  0 disk
loop0                       7:0    0 63.3M  1 loop  /snap/core20/1828
loop1                       7:1    0 91.9M  1 loop  /snap/lxd/24061
loop2                       7:2    0 49.9M  1 loop  /snap/snapd/18357
sda                         8:0    0   50G  0 disk
├─sda1                      8:1    0    1M  0 part
├─sda2                      8:2    0    2G  0 part  /boot
└─sda3                      8:3    0   48G  0 part
  └─dm_crypt-0            253:0    0   38G  0 crypt
    └─ubuntu--vg-ubuntu--lv 253:1    0   19G  0 lvm   /
sr0                        11:0    1 99.4M  0 rom
sr1                        11:1    1  1.4G  0 rom
sandbox@sandboxserver:~$ _
```

c.

5. Type in the command, "sudo cryptsetup resize dm_crypt-<crypt #>", press the "Enter" key, input the password for the drive, and press the "Enter" key again.
   a. Example: **sudo cryptsetup resize dm_crypt-0**
   b. Type in the **lsblk** command again, and press enter to make sure that the corresponding "dm_crypt-<crypt #>" has actually increased in size.

```
sandbox@sandboxserver:~$ sudo cryptsetup resize dm_crypt-0
Enter passphrase for /dev/sda3:
sandbox@sandboxserver:~$ lsblk
NAME                      MAJ:MIN RM  SIZE RO TYPE  MOUNTPOINT
fd0                         2:0    1  1.4M  0 disk
loop0                       7:0    0 63.3M  1 loop  /snap/core20/1828
loop1                       7:1    0 91.9M  1 loop  /snap/lxd/24061
loop2                       7:2    0 49.9M  1 loop  /snap/snapd/18357
sda                         8:0    0   50G  0 disk
├─sda1                      8:1    0    1M  0 part
├─sda2                      8:2    0    2G  0 part  /boot
└─sda3                      8:3    0   48G  0 part
  └─dm_crypt-0            253:0    0   48G  0 crypt
    └─ubuntu--vg-ubuntu--lv 253:1    0   19G  0 lvm   /
sr0                        11:0    1 99.4M  0 rom
sr1                        11:1    1  1.4G  0 rom
sandbox@sandboxserver:~$
```

c.

6. Type in the command, **sudo pvs**, press the "Enter" key, and make note of the "PV" path for the root, "/", partition, and the "PFree" size value.
   a. PV Path - **/dev/mapper/dm_crypt-0**
   b. PFree - **18.99G**

```
sandbox@ubuntu2004server:~$ sudo pvs
  PV                    VG        Fmt  Attr PSize  PFree
  /dev/mapper/dm_crypt-0 ubuntu-vg lvm2 a--  37.98g 18.99g
```

c.

7. Type in the command, "sudo pvresize /<PV path>", press the "Enter" key, and make sure that the terminal says 1 (or more) "physical volume(s) resized or updated".
   a. Example: **sudo pvresize /dev/mapper/dm_crypt-0**

```
sandbox@ubuntu2004server:~$ sudo pvresize /dev/mapper/dm_crypt-0
  Physical volume "/dev/mapper/dm_crypt-0" changed
  1 physical volume(s) resized or updated / 0 physical volume(s) not resized
```

b.

8. Type in the command, "sudo lvextend -L +<PFree Size>G /<PV path (except dm_crypt)>/<root drive name>", and press the "Enter" key.
   a. Example: **sudo lvextend -L +18.99G /dev/mapper/ubuntu--vg-ubuntu--lv**
   b. Type in the **lsblk** command again, and press enter to make sure that the corresponding root, "/", partition has actually increased in size, in the "lsblk" view.

```
sandbox@ubuntu2004server:~$ sudo lvextend  -L +18.9G /dev/mapper/ubuntu--vg-ubuntu--lv
  Rounding size to boundary between physical extents: 18.90 GiB.
  Size of logical volume ubuntu-vg/ubuntu-lv changed from <18.99 GiB (4861 extents) to 37.89 GiB (97
00 extents).
  Logical volume ubuntu-vg/ubuntu-lv successfully resized.
sandbox@ubuntu2004server:~$ lsblk
NAME                      MAJ:MIN RM  SIZE RO TYPE  MOUNTPOINT
fd0                         2:0    1  1.4M  0 disk
loop0                       7:0    0 63.3M  1 loop  /snap/core20/1828
loop1                       7:1    0 91.9M  1 loop  /snap/lxd/24061
loop2                       7:2    0 49.9M  1 loop  /snap/snapd/18357
sda                         8:0    0   50G  0 disk
├─sda1                      8:1    0    1M  0 part
├─sda2                      8:2    0    2G  0 part  /boot
└─sda3                      8:3    0   48G  0 part
  └─dm_crypt-0            253:0    0   48G  0 crypt
    └─ubuntu--vg-ubuntu--lv 253:1    0 37.9G  0 lvm   /
sr0                        11:0    1 99.4M  0 rom
sr1                        11:1    1  1.4G  0 rom
sandbox@ubuntu2004server:~$
```

c.

9. Type in the command, "sudo resize2fs /<PV path (except dm_crypt)>/<root drive name>", and press the "Enter" key.
   a. Example: **sudo resize2fs /dev/mapper/ubuntu--vg-ubuntu--lv**

```
sandbox@sandboxserver:/$ sudo resize2fs /dev/mapper/ubuntu--vg-ubuntu--lv
[sudo] password for sandbox:
resize2fs 1.45.5 (07-Jan-2020)
Filesystem at /dev/mapper/ubuntu--vg-ubuntu--lv is mounted on /; on-line resizing required
old_desc_blocks = 3, new_desc_blocks = 5
The filesystem on /dev/mapper/ubuntu--vg-ubuntu--lv is now 9937920 (4k) blocks long.
```

b.

10. Type in the command, **df -h**, to make sure that the corresponding root, "/", partition has actually increased in size, in the eyes of the ext4 file system.
    a. Here, you are looking for the "Avail" value corresponding to the "Mounted on" "**/**" row.

```
sandbox@sandboxserver:/$ df -h
Filesystem                         Size  Used Avail Use% Mounted on
udev                               3.9G     0  3.9G   0% /dev
tmpfs                              793M  1.6M  792M   1% /run
/dev/mapper/ubuntu--vg-ubuntu--lv   38G  6.3G   30G  18% /
tmpfs                              3.9G     0  3.9G   0% /dev/shm
tmpfs                              5.0M     0  5.0M   0% /run/lock
tmpfs                              3.9G     0  3.9G   0% /sys/fs/cgroup
/dev/loop0                          50M   50M     0 100% /snap/snapd/18357
/dev/loop1                          92M   92M     0 100% /snap/lxd/24061
/dev/loop2                          64M   64M     0 100% /snap/core20/1828
/dev/sda2                          2.0G  108M  1.7G   6% /boot
tmpfs                              793M     0  793M   0% /run/user/1000
```

    b.

11. Type in the **lsblk** command again, and press enter to make sure that the corresponding root, "/", partition still has its increased size value.

```
sandbox@sandboxserver:/$ lsblk
NAME                      MAJ:MIN RM  SIZE RO TYPE  MOUNTPOINT
fd0                         2:0    1  1.4M  0 disk
loop0                       7:0    0 49.9M  1 loop  /snap/snapd/18357
loop1                       7:1    0 91.9M  1 loop  /snap/lxd/24061
loop2                       7:2    0 63.3M  1 loop  /snap/core20/1828
sda                         8:0    0   50G  0 disk
├─sda1                      8:1    0    1M  0 part
├─sda2                      8:2    0    2G  0 part  /boot
└─sda3                      8:3    0   48G  0 part
  └─dm_crypt-0            253:0    0   48G  0 crypt
    └─ubuntu--vg-ubuntu--lv 253:1    0 37.9G  0 lvm   /
sr0                        11:0    1 99.4M  0 rom
sr1                        11:1    1  1.4G  0 rom
```

    a.

12. You have successfully extended an LVM partition, with LUKS encryption! 😃