

# LVM - extend the volume

To extend the volume, we have to attach new physical (virtual) disk on hypervisor.

## Preparations

We need to understand which disk need to be extended: In my case it is a root which is full.

```
df -h
```

```
[root@lt58sat1 anton]# df -h
Filesystem                Size      Used Avail Use% Mounted on
devtmpfs                  4.0M        0   4.0M   0% /dev
tmpfs                     477M        0   477M   0% /dev/shm
tmpfs                     191M    3.0M   188M   2% /run
/dev/mapper/ol_vbox-root  17G       17G    18M 100% /
/dev/sda1                 960M    476M   485M  50% /boot
/dev/mapper/vg--lt58ncp1sat1--data-lv--lt58ncp1sat1--data 150G    100G    51G  67% /mnt/lt58ncp1sat1-data
tmpfs                     96M        0    96M   0% /run/user/1000
```

and verify it is LVM

```
lsblk
```

```
[root@lt58sat1 anton]# lsblk
NAME                                MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
sda                                  8:0    0   20G  0 disk
├─sda1                               8:1    0    1G  0 part /boot
├─sda2                               8:2    0   19G  0 part
├─ol_vbox-root                       252:0   0    17G  0 lvm. /
└─ol_vbox-swap                       252:1   0     2G  0 lvm [SWAP]
sdb                                  8:16   0  150G  0 disk
└─vg--lt58ncp1sat1--data-lv--lt58ncp1sat1--data 252:2   0 149.9G  0 lvm /mnt/lt58ncp1sat1-data
sdc                                  8:32   0    50G  0 disk
sr0                                  11:0    1 1024M  0 rom
```

After adding the disk, it should appear in the list:

```
lsblk
```

```
[root@lt58sat1 anton]# lsblk
NAME                                MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
sda                                  8:0    0   20G  0 disk
├─sda1                               8:1    0    1G  0 part /boot
├─sda2                               8:2    0   19G  0 part
│   ├─ol_vbox-root                   252:0   0   17G  0 lvm /
│   └─ol_vbox-swap                   252:1   0    2G  0 lvm [SWAP]
sdb                                  8:16   0  150G  0 disk
└─vg--lt58ncp1sat1--data-lv--lt58ncp1sat1--data 252:2   0 149.9G  0 lvm /mnt/lt58ncp1sat1-data
sdc                                  8:32   0   50G  0 disk
sr0                                  11:0    1 1024M  0 rom
```

Let's note which file system in use: 'XFS' or 'ext4', will be needed later..

```
lsblk -f
```

```
[root@lt58sat1 anton]# lsblk -f
NAME                                FSTYPE    FSVER    LABEL UUID                                FSAVAIL FSUSE% MOUNTPOINTS
sda                                  xfs
├─sda1                               xfs
├─sda2                               LVM2_member LVM2 001 1NSByB-LaV5-PwbI-J7uK-tyer-c7TL-vg30PB 484.9M 49% /boot
│   ├─ol_vbox-root                   xfs
│   └─ol_vbox-swap                   swap      1      9fd91766-82f0-49e4-9281-03f20efb6632 17.1M 100% /
sdb                                  LVM2_member LVM2 001 eFwsQp-rLnt-WRGw-eYrG-h2Y6-qc9x-NdISvc 50.3G 66% /mnt/lt58ncp1sat1-data
sdc                                  xfs
sr0
```

We are good to go, prepare for activities. Replace your values for variables `dev` and `fs` with correct ones. Subtract `0.1` from partition size:

```
export dev="/dev/sdc"
```

Disk need to be marked as a "Physical Volume" to be able to join the "volume group" and list:

```
pvcreate ${dev}
pvscan
```

```
[root@lt58sat1 anton]# pvcreate /dev/sdc
Physical volume "/dev/sdc" successfully created.
[root@lt58sat1 anton]# pvscan
PV /dev/sda2    VG ol_vbox          lvm2 [19.00 GiB / 0 free]
PV /dev/sdb    VG vg-lt58ncp1sat1-data lvm2 [150.00 GiB / 96.00 MiB free]
PV /dev/sdc    .                  lvm2 [50.00 GiB]
Total: 3 [218.99 GiB] / in use: 2 [168.99 GiB] / in no VG: 1 [50.00 GiB]
```

First, let's define, which 'volume group' need to be extended

```
vgscan
```

```
[root@lt58sat1 anton]# vgscan
Found volume group "ol_vbox" using metadata type lvm2
Found volume group "vg-lt58ncp1sat1-data" using metadata type lvm2
```

In my case, it is `ol_vbox`. Let's define it:

```
export vg="ol_vbox"
```

Let add "new Physical Volume" to the "Virtual Group":

```
echo ${vg}
echo ${dev}
vgextend ${vg} ${dev}
```

```
[root@lt58sat1 anton]# vgextend ${vg} ${dev}
Volume group "ol_vbox" successfully extended
```

List Physical Volumes, new disk should be shown

```
pvscan
```

```
[root@lt58sat1 anton]# pvscan
PV /dev/sda2   VG ol_vbox          lvm2 [<19.00 GiB / 0   free]
PV /dev/sdc   VG ol_vbox          lvm2 [<50.00 GiB / <50.00 GiB free]
PV /dev/sdb   VG vg-lt58ncp1sat1-data lvm2 [<150.00 GiB / 96.00 MiB free]
Total: 3 [<218.99 GiB] / in use: 3 [<218.99 GiB] / in no VG: 0 [0  ]
```

Now it is a time to extend Logical Volume. Let's observe current ones first

```
lvdisplay
```

```
Cannot process volume group root
[root@lt58sat1 anton]# lvs
--- Logical volume ---
LV Path                /dev/ol_vbox/swap
LV Name                 swap
VG Name                ol_vbox
LV UUID                HUSUc4-m5pf-jwiW-i44i-2nYg-bvzr-38eMF1
LV Write Access        read/write
LV Creation host, time vbox, 2025-02-13 18:50:14 +0200
LV Status               available
# open                  2
LV Size                 2.00 GiB
Current LE              512
Segments                1
Allocation              inherit
Read ahead sectors     auto
 - currently set to    256
Block device            252:1
```

```
--- Logical volume ---
LV Path                /dev/ol_vbox/root
LV Name                 root
VG Name                ol_vbox
LV UUID                WADuHe-FyDy-QRg5-Q5nM-GU19-htHj-effg0P
LV Write Access        read/write
LV Creation host, time vbox, 2025-02-13 18:50:15 +0200
LV Status               available
# open                  1
LV Size                 <17.00 GiB
Current LE              4351
Segments                1
Allocation              inherit
Read ahead sectors     auto
 - currently set to    256
Block device            252:0
```

```
--- Logical volume ---
LV Path                /dev/vg-lt58ncp1sat1-data/lv-lt58ncp1sat1-data
LV Name                 lv-lt58ncp1sat1-data
VG Name                vg-lt58ncp1sat1-data
LV UUID                K1F7L4-5Kl1-wzIg-5ywt-aZdb-EBz0-qdLxjn
LV Write Access        read/write
LV Creation host, time lt58ncp1sat1, 2025-02-14 10:40:12 +0200
LV Status               available
# open                  1
LV Size                 149.90 GiB
Current LE              38375
Segments                1
Allocation              inherit
Read ahead sectors     auto
 - currently set to    256
Block device            252:2
```

In my case, "Volume Group" is linked to "Logical Volume" has path "/dev/ol\_vbox/root". Set up extension size.

```
export lv="/dev/ol_vbox/root"
export size="49.9G"
```

and extend "Logical Volume"

```
lvextend -L +${size} ${lv}
```

```
[root@lt58sat1 anton]# lvextend -L +${size} ${lv}
Rounding size to boundary between physical extents: 49.90 GiB.
Size of logical volume ol_vbox/root changed from <17.00 GiB (4351 extents) to <66.90 GiB (17126 extents).
Logical volume ol_vbox/root successfully resized.
```

Depending on which file system is in use, note current partition size, expand it and check size again:

```
df -h

# for "ext4"
resize2fs ${lv}

# for "xfs"
xfs_growfs ${lv}

df -h
```

```
[root@lt58sat1 anton]# df -h /
Filesystem      Size  Used Avail Use% Mounted on
/dev/mapper/ol_vbox-root 17G   17G   18M 100% /
[root@lt58sat1 anton]# xfs_growfs ${lv}
meta-data=/dev/mapper/ol_vbox-root isize=512    agcount=4, agsize=1113856 blks
         =                       sectsz=512   attr=2, projid32bit=1
         =                       crc=1      finobt=1, sparse=1, rmapbt=0
         =                       reflink=1   bigtime=1 inobtcount=1 nnext64=0
         =                       exchange=0
data      =                       bsize=4096 blocks=4455424, imaxpct=25
         =                       sunit=0    swidth=0 blks
naming    =version 2                bsize=4096 ascii-ci=0, ftype=1, parent=0
log       =internal log           bsize=4096 blocks=16384, version=2
         =                       sectsz=512 sunit=0 blks, lazy-count=1
realtime  =none                   extsz=4096 blocks=0, rtextents=0
data blocks changed from 4455424 to 17537024
[root@lt58sat1 anton]# df -h /
Filesystem      Size  Used Avail Use% Mounted on
/dev/mapper/ol_vbox-root 67G   18G   50G  26% /
```

Q.E.D.

Storage management using LVM is a logical process, once understood.

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