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Extend Centos VM disk

This procedure describes the commands required to extend the disk size of a NetYCE VM based on RHEL/CentOS 6 or RHEL/CentOS 7. Both procedures are similar but differ in the details.

RHEL/CentOS 7

1) Resize the virtual disk

First, halt and power down the VM. Using the hypervisor resize the virtual disk of the VM. In the example sessions the size is increased from 8 GB to 40 GB.

> VirtualBox cannot resize VMDK disks, you need to convert to VDI disk format first. After halting the VM, execute on the host cli while in the appropriate directory the command below. The example converts the “Genesis” disk from vmdk to vdi format
>
> ```
> VBoxManage clonehd --format VDI Genesis.vmdk Genesis.vdi
> ```
>
> If the disk-filename or extension was changed, detach it from the Genesis storage controller using virtual box gui (machine - settings - storage) and attach the new image to the controller (add hard disk - choose existing)
>
> Then you can resize the disk to desired value.

Start the VM and login using 'root'

2) Recreate the disk partition

Using **`fdisk`**, delete the second partition and recreate it using the new size. Fist note the current partitions

```
root@genesis7 ~
# fdisk /dev/sda

Command (m for help): p

Disk /dev/sda: 8589 MB, 8589934592 bytes, 16777216 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: 0x000ae8d2

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1   *        2048     2099199     1048576   83  Linux
```

```
/dev/sda2         2099200    16777215     7339008   8e  Linux LVM
```

Delete the second (LVM) partition

```
Command (m for help): d
Partition number (1,2, default 2): 2
Partition 2 is deleted
```

And recreate it. Use the default start and end blocks. Then set the partition type to LVM again (8e).

```
Command (m for help): n
Partition type:
   p   primary (1 primary, 0 extended, 3 free)
   e   extended
Select (default p): p
Partition number (2-4, default 2): 2
First sector (2099200-16777215, default 2099200):
Using default value 2099200
Last sector, +sectors or +size{K,M,G} (2099200-16777215, default 16777215):
Using default value 16777215
Partition 2 of type Linux and of size 7 GiB is set

Command (m for help): t
Partition number (1,2, default 2): 2
Hex code (type L to list all codes): 8e
Changed type of partition 'Linux' to 'Linux LVM'
```

Verify the results and when satisfied write it to disk. Abort if incorrect, nothing will change until the 'w' is done.

```
Command (m for help): p

Disk /dev/sda: 8589 MB, 8589934592 bytes, 16777216 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: 0x000ae8d2

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1   *        2048     2099199     1048576   83  Linux
/dev/sda2         2099200    16777215     7339008   8e  Linux LVM

Command (m for help): w
```

3) Reboot the VM

```
# reboot
```

4) Verify the disk partitions

Login as 'root' and verify the disk partitions using **fdisk** as above.

```
# fdisk /dev/sda

Command (m for help): p

Disk /dev/sda: 43.4 GB, 43411046400 bytes, 84787200 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: 0x000ae8d2

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1   *        2048     2099199     1048576   83  Linux
/dev/sda2         2099200    84787199    41344000   8e  Linux LVM

Command (m for help): q
```

5) Resize the physical volume

Using **pvresize**

```
# pvresize /dev/sda2
  Physical volume "/dev/sda2" changed
  1 physical volume(s) resized or updated / 0 physical volume(s) not resized
```

6) Resize the logical volume

Using **lvresize**. The name of the /dev/mapper device may differ, use the <tab> for filename completion to find the reference for 'centos' and' root'.

```
# lvresize /dev/mapper/centos_c7--2-root /dev/sda2
  Size of logical volume centos_c7-2/root changed from <6.20 GiB (1586
extents) to 38.62 GiB (9888 extents).
  Logical volume centos_c7-2/root successfully resized.
```

7) Extend the xfs filesystem

Using **xfs_growfs**

```
# xfs_growfs /dev/mapper/centos_c7--2-root
meta-data=/dev/mapper/centos_c7--2-root isize=512    agcount=4,
agsize=406016 blks
```

```
         =                       sectsz=512   attr=2, projid32bit=1
         =                       crc=1        finobt=0 spinodes=0
data     =                       bsize=4096   blocks=1624064, imaxpct=25
         =                       sunit=0      swidth=0 blks
naming   =version 2              bsize=4096   ascii-ci=0 ftype=1
log      =internal               bsize=4096   blocks=2560, version=2
         =                       sectsz=512   sunit=0 blks, lazy-count=1
realtime =none                   extsz=4096   blocks=0, rtextents=0
data blocks changed from 1624064 to 10125312
```

8) Verify the results

Using **`df -h /`**

```
# df -h /
Filesystem                     Size  Used Avail Use% Mounted on
/dev/mapper/centos_c7--2-root   39G  4.9G   34G  13% /
```

9) Check filesystem

```
# touch /forcefsck
# reboot
```

When the system returns the extended disk is ready for use.

RHEL/CentOS 6

1) Resize the virtual disk

First, halt and power down the VM. Using the hypervisor resize the virtual disk of the VM.

> VirtualBox cannot resize VMDK disks, you need to convert to VDI disk format first. After halting the VM, execute on the host cli while in the appropriate directory the command below. The example converts the “Genesis” disk from vmdk to vdi format
>
> ```
> VBoxManage clonehd --format VDI Genesis.vmdk Genesis.vdi
> ```
>
> If the disk-filename or extension was changed, detach it from the Genesis storage controller using virtual box gui (machine - settings - storage) and attach the new image to the controller (add hard disk - choose existing)
>
> Then you can resize the disk to desired value.

Start the VM and login using 'root'

2) Recreate the disk partition

The session samples show how a system using two LVM partitions is extended, not by adding a third partition by by extending the third partition. Look at the last section of this article how to extend the disk size of a RedHat/CentOS 6 system with an extra partition.

Using **`fdisk`**, delete the third partition and recreate it using the new size. First note the current partitions

```
# fdisk /dev/sda

WARNING: DOS-compatible mode is deprecated. It's strongly recommended to
         switch off the mode (command 'c') and change display units to
         sectors (command 'u').

Command (m for help): c
DOS Compatibility flag is not set

Command (m for help): u
Changing display/entry units to sectors

Command (m for help): p

Disk /dev/sda: 107.4 GB, 107374182400 bytes
255 heads, 63 sectors/track, 13054 cylinders, total 209715200 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 identifier: 0x00034ecd

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1   *        2048     1026047      512000   83  Linux
/dev/sda2         1026048     8388607     3681280   8e  Linux LVM
/dev/sda3         8388608    16777215     4194304   8e  Linux LVM
```

Delete the second (LVM) partition

```
Command (m for help): d
Partition number (1-4): 3
```

And recreate it. Use the default start and end blocks. Then set the partition type to LVM again (8e).

```
Command (m for help): n
Command action
   e   extended
   p   primary partition (1-4)
p
Partition number (1-4): 3
First sector (8388608-209715199, default 8388608):
Using default value 8388608
```

```
Last sector, +sectors or +size{K,M,G} (8388608-209715199, default
209715199):
Using default value 209715199

Command (m for help): t
Partition number (1-4): 3
Hex code (type L to list codes): 8e
Changed system type of partition 3 to 8e (Linux LVM)

Command (m for help): p

Disk /dev/sda: 107.4 GB, 107374182400 bytes
255 heads, 63 sectors/track, 13054 cylinders, total 209715200 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 identifier: 0x00034ecd

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1   *        2048     1026047      512000   83  Linux
/dev/sda2         1026048     8388607     3681280   8e  Linux LVM
/dev/sda3         8388608   209715199   100663296   8e  Linux LVM
```

Verify the results and when satisfied write it to disk. Abort if incorrect, nothing will change until the 'w' is done.

```
Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.

WARNING: Re-reading the partition table failed with error 16: Device or
resource busy.
The kernel still uses the old table. The new table will be used at
the next reboot or after you run partprobe(8) or kpartx(8)
Syncing disks.
```

3) Reboot the VM

```
# reboot
```

4) Verify the disk partitions

Login as 'root' and verify the disk partitions using **`fdisk`** as above.

5) Resize the physical volume

Using **pvresize**

```
# pvresize /dev/sda3
  Physical volume "/dev/sda3" changed
  1 physical volume(s) resized / 0 physical volume(s) not resized
```

6) Resize the logical volume

Using **lvresize**. The name of the /dev/mapper device may differ, use the <tab> for filename completion to find the reference for 'VolGroup' and' root'.

```
# lvresize /dev/mapper/
control           VolGroup-lv_root  VolGroup-lv_swap

# lvresize /dev/mapper/VolGroup-lv_root /dev/sda3
  Size of logical volume VolGroup/lv_root changed from 7.11 GiB (1819
extents) to 99.11 GiB (25371 extents).
  Logical volume lv_root successfully resized.
```

7) Extend the ext4 filesystem

Using **resize2fs**

```
# resize2fs /dev/mapper/VolGroup-lv_root
resize2fs 1.41.12 (17-May-2010)
Filesystem at /dev/mapper/VolGroup-lv_root is mounted on /; on-line resizing
required
old desc_blocks = 1, new_desc_blocks = 7
Performing an on-line resize of /dev/mapper/VolGroup-lv_root to 25979904
(4k) blocks.
```

8) Verify the results

Using **df -h /**

```
# df -h /
Filesystem            Size  Used Avail Use% Mounted on
/dev/mapper/VolGroup-lv_root
                       98G  3.3G   90G   4% /
```

9) Check filesystem

```
# touch /forcefsck
# reboot
```

When the system returns the extended disk is ready for use.

Adding a partition to RHEL/CentOS 6

locate filesystem to extend

```
# df -h
```

eg: /dev/mapper/VolGroup-lv_root
we need the volgroup **VolGroup** and logical volume **lv_root** later

halt vm

```
# halt
```

compact the VM disk using VirtualBox cli tool

```
cd VirtualBox-VMs/YceOne/
VBoxManage modifyhd yceone-disk1.vdi --compact
```

resize vm disk, eg to 8G

```
VBoxManage modifyhd yceone-disk1.vdi --resize 8192
```

boot vm normally, login as root
locate next free partition number on /dev/sda

```
# fdisk -l
```

create extra primary partition of desired size (the amount added)

```
# fdisk /dev/sda
fdisk> c
fdisk> u
fdisk> n (add partition)
fdisk> p (primary)
fdisk> 3 (partiton)
fdisk> <enter> (default start)
fdisk> <enter> (default end)
fdisk> t (type)
fdisk> 3 (partition)
fdisk> 8e (linux LVM)
```

```
fdisk> w
```

halt and reboot

```
# halt
```

add partition as new physical volume and extend the volume group with it

```
# lvm
lvm> pvcreate /dev/sda3
lvm> vgextend VolGroup /dev/sda3
lvm> lvextend -L+10000 /dev/VolGroup/lv_root
  this reports the number of extends available. take that number, multiply
by 4 and specify that instead
lvm> lvextend -L+4092 /dev/VolGroup/lv_root
  to be sure no other extends are available try to extend by one more
lvm> lvextend -L+1 /dev/VolGroup/lv_root
lvm> quit (exit lvm)
```

resize the filesystem

```
# resize2fs -F /dev/VolGroup/lv_root
```

Done! check free size

```
# df -h
```