

Extending “/” root partition in Linux VM with LVM

We will be extending the “/” partition from 17GB to ~27 GB – adding 10GB to “/”
The VM HD1 = 36 GB

*** Make sure you perform FULL backups of your system before doing this procedure ***

#1) Collect information about your current environment:

“df -h” --- Displays your current disk partition size:

```
[root@localhost lvmlog]# df -h
Filesystem                Size      Used Avail Use% Mounted on
/dev/mapper/VolGroup00-LogVol00  17G    2.5G    13G   17% /
/dev/mapper/VolGroup00-LogVol03   713M    162M    515M   24% /tmp
/dev/mapper/VolGroup00-LogVol02   2.0G     72M    1.8G    4% /var/log
/dev/sda1                    99M     19M     76M   20% /boot
tmpfs                        3.8G         0    3.8G    0% /dev/shm
```

“pvdisplay” --- Displays attributes of the physical LVM volume. Note PVSIZE and Free PE (Physical Extents)

```
[root@localhost lvmlog]# pvdisplay
/dev/hda: open failed: No medium found *** This is OK, it's just the CDROM. ***
--- Physical volume ---
PV Name           /dev/sda2
VG Name           VolGroup00
PV Size           35.90 GB / not usable 22.10 MB
Allocatable       yes (but full)
PE Size (KByte)   32768
Total PE          1148
Free PE           0
Allocated PE      1148
PV UUID           sS7pDq-F8b0-oaU3-noLN-7dlv-IWSz-njgEFE
```

“vgdisplay” --- Displays attributes of the LVM volume group.

--- Volume group ---

VG Name	VolGroup00
System ID	
Format	lvm2
Metadata Areas	1
Metadata Sequence No	5
VG Access	read/write
VG Status	resizable
MAX LV	0
Cur LV	4
Open LV	4
Max PV	0
Cur PV	1
Act PV	1
VG Size	35.88 GB
PE Size	32.00 MB
Total PE	1148
Alloc PE / Size	1148 / 35.88 GB
Free PE / Size	0 / 0
VG UUID	sajlPQ-4izJ-PDh4-OqSg-mdh6-lz4c-wZSUrQ

“lvdisplay” --- Displays attributes of the LVM volume group. We’ll just look at the lv we want to expand.

--- Logical volume ---

LV Name	/dev/VolGroup00/LogVol00
VG Name	VolGroup00
LV UUID	VOK07i-dqHt-7qK4-42zB-RT85-P89B-CXEMaI
LV Write Access	read/write
LV Status	available
# ope	1
LV Size	16.59 GB ----- This is the “root” partition that we’ll expand.
Current LE	531
Segments	1
Allocation	inherit
Read ahead sectors	auto
- currently set to	256
Block device	253:0

#2) Cleanly Shutdown the Linux VM guest and resize Hard Disk 1:

It's a good idea to remove any snapshots before doing this procedure. You should extend the VM's Hard disk by using the VIC gui (under Edit Settings) OR use the service console's VMKFSTOOLS command cli. --- Power the VM guest back on and login.

#3) Use "fdisk" to create a new partition on sda. You will be adding this partition to your existing volume, providing additional space.

```
[root@localhost lvmlog]# fdisk /dev/sda
```

The number of cylinders for this disk is set to 6004.

There is nothing wrong with that, but this is larger than 1024, and could in certain setups cause problems with:

- 1) software that runs at boot time (e.g., old versions of LILO)
- 2) booting and partitioning software from other OS's (e.g., DOS FDISK, OS/2 FDISK)

Command (m for help): p

Disk /dev/sda: 49.3 GB, 49392123904 bytes ---- HERE, you will see a larger physical disk.
255 heads, 63 sectors/track, 6004 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes

Device	Boot	Start	End	Blocks	Id	System
/dev/sda1	*	1	13	104391	83	Linux
/dev/sda2		14	4699	37640295	8e	Linux LVM

Command (m for help): n

Command action

e extended

p primary partition (1-4) p

Partition number (1-4): 3

First cylinder (4700-6004, default 4700): *** Take the defaults here. You want all of the partition.

Using default value 4700

Last cylinder or +size or +sizeM or +sizeK (4700-6004, default 6004):

Using default value 6004

Command (m for help): p

Disk /dev/sda: 49.3 GB, 49392123904 bytes
255 heads, 63 sectors/track, 6004 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes

Device	Boot	Start	End	Blocks	Id	System
/dev/sda1	*	1	13	104391	83	Linux
/dev/sda2		14	4699	37640295	8e	Linux LVM
/dev/sda3		4700	6004	10482412+	83	Linux

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: 49.3 GB, 49392123904 bytes
255 heads, 63 sectors/track, 6004 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes

Device	Boot	Start	End	Blocks	Id	System
/dev/sda1	*	1	13	104391	83	Linux
/dev/sda2		14	4699	37640295	8e	Linux LVM
/dev/sda3		4700	6004	10482412+	8e	Linux LVM

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.
Syncing disks.

#4) Verify your additional, new partition:

```
[root@localhost lvmlog]# fdisk -l
```

```
Disk /dev/sda: 49.3 GB, 49392123904 bytes
255 heads, 63 sectors/track, 6004 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Device Boot    Start      End   Blocks    Id System
/dev/sda1  *         1       13   104391    83  Linux
/dev/sda2             14     4699  37640295    8e  Linux LVM
/dev/sda3         4700     6004 10482412+    8e  Linux LVM
```

#5) Add the new disk device (/dev/sda3) to the LVM configuration: *Note: You may need to reboot the Linux guest.

```
[root@localhost lvmlog]# pvcreate /dev/sda3
Device /dev/sda3 not found (or ignored by filtering). *** NEED TO REBOOT
root@localhost lvmlog]# reboot
```

```
[root@localhost lvmlog]# pvcreate /dev/sda3
Physical volume "/dev/sda3" successfully created
```

```
root@localhost lvmlog]# pvdisplay
```

```
--- Physical volume ---
PV Name           /dev/sda2
VG Name           VolGroup00
PV Size           35.90 GB / not usable 22.10 MB
Allocatable       yes (but full)
PE Size (KByte)   32768
Total PE          1148
Free PE           0
Allocated PE      1148
PV UUID           sS7pDq-F8b0-0aU3-noLN-7dlv-IWSz-njgEFE
```

```
"/dev/sda3" is a new physical volume of "10.00 GB"  
--- NEW Physical volume ---  
PV Name          /dev/sda3  
VG Name  
PV Size          10.00 GB  
Allocatable      NO  
PE Size (KByte)  0  
Total PE         0  
Free PE          0  
Allocated PE     0  
PV UUID          RJ7vN1-d59J-d2a0-0Zb0-H6fB-Rzd1-sAe2vZ
```

#6) Extend the existing Volume Group:

```
[root@localhost lvmlog]# vgdisplay (Let's verify the VG Size and Free PE / Size before we start.  
--- Volume group ---  
VG Name          VolGroup00  
System ID  
Format           lvm2  
Metadata Areas   1  
Metadata Sequence No 5  
VG Access        read/write  
VG Status         resizable  
MAX LV           0  
Cur LV          4  
Open LV          4  
Max PV           0  
Cur PV          1  
Act PV           1  
VG Size          35.88 GB  
PE Size          32.00 MB  
Total PE         1148  
Alloc PE / Size  1148 / 35.88 GB  
Free PE / Size   0 / 0  
VG UUID          sajIPQ-4izJ-PDh4-OqSg-mdh6-lz4c-wZSUrQ
```

```
[root@localhost lvmlog]# vgextend VolGroup00 /dev/sda3  
Volume group "VolGroup00" successfully extended
```

```
[root@localhost lvmlog]# vgdisplay (Note: We now have additional Free space)
```

```
--- Volume group ---
```

```
VG Name                VolGroup00  
System ID  
Format                 lvm2  
Metadata Areas        2  
Metadata Sequence No  6  
VG Access              read/write  
VG Status              resizable  
MAX LV                0  
Cur LV               4  
Open LV               4  
Max PV                0  
Cur PV               2  
Act PV                2  
VG Size                45.84 GB  
PE Size                32.00 MB  
Total PE              1467  
Alloc PE / Size       1148 / 35.88 GB  
Free PE / Size        319 / 9.97 GB  
VG UUID                sajlPQ-4izJ-PDh4-OqSg-mdh6-lz4c-wZSUrQ
```

#7) Extend the logical volume that contains “/”:

```
[root@localhost lvmlog]# lvs (Let's just look at LogVol00 – the root vol)
--- Logical volume ---
```

```
LV Name           /dev/VolGroup00/LogVol00
VG Name           VolGroup00
LV UUID           VOK07i-dqHt-7qK4-42zB-RT85-P89B-CXEMa1
LV Write Access   read/write
LV Status         available
# open            1
LV Size           16.59 GB
Current LE        531
Segments          1
Allocation        inherit
Read ahead sectors auto
- currently set to 256
Block device      253:0
```

```
[root@localhost lvmlog]# lvextend -l +319 /dev/VolGroup00/LogVol00 /dev/sda3
Extending logical volume LogVol00 to 26.56 GB
Logical volume LogVol00 successfully resized
```

```
[root@localhost lvmlog]# lvs (Let's just look at LogVol00 – the root vol)
--- Logical volume ---
```

```
LV Name           /dev/VolGroup00/LogVol00
VG Name           VolGroup00
LV UUID           VOK07i-dqHt-7qK4-42zB-RT85-P89B-CXEMa1
LV Write Access   read/write
LV Status         available
# open            1
LV Size           26.56 GB *** Notice the new space.
Current LE        850
Segments          2
Allocation        inherit
Read ahead sectors auto
- currently set to 256
Block device      253:0
```

#8) Resize the “/” root partition:

[root@localhost lvmlog]# df -h (Let's take a look at the FS before resize. Note “/” size)

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/VolGroup00-LogVol00	17G	2.5G	13G	17%	/
/dev/mapper/VolGroup00-LogVol03	713M	162M	515M	24%	/tmp
/dev/mapper/VolGroup00-LogVol02	2.0G	72M	1.8G	4%	/var/log
/dev/sda1	99M	19M	76M	20%	/boot
tmpfs	3.8G	0	3.8G	0%	/dev/shm

[root@localhost lvmlog]# resize2fs /dev/VolGroup00/LogVol00

resize2fs 1.39 (29-May-2006)

Filesystem at /dev/VolGroup00/LogVol00 is mounted on /; on-line resizing required

Performing an on-line resize of /dev/VolGroup00/LogVol00 to 6963200 (4k) blocks.

The filesystem on /dev/VolGroup00/LogVol00 is now 6963200 blocks long.

[root@localhost lvmlog]# df -h (Let's take a look at the new size of “/”)

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/VolGroup00-LogVol00	26G	2.5G	22G	11%	/
/dev/mapper/VolGroup00-LogVol03	713M	162M	515M	24%	/tmp
/dev/mapper/VolGroup00-LogVol02	2.0G	72M	1.8G	4%	/var/log
/dev/sda1	99M	19M	76M	20%	/boot
tmpfs	3.8G	0	3.8G	0%	/dev/shm

That's it... It's always a good idea to reboot your VM after this procedure just to make sure all is well.