

Louisiana VMware Users Group

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-F8b0-0aU3-noLN-7dlv-IWSz-njgEFE

Louisiana VMware Users Group

“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

Louisiana VMware Users Group

#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

Louisiana VMware Users Group

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.

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#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
```

Louisiana VMware Users Group

"/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	sajlPQ-4izJ-PDh4-OqSg-mdh6-lz4c-wZSUrQ

Louisiana VMware Users Group

```
[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
```

Louisiana VMware Users Group

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

```
[root@localhost lvmlog]# lvsdisplay (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-CXEMaI
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]# lvsdisplay (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-CXEMaI
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
```

Louisiana VMware Users Group

#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.

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