

LVM: Extend an existing Logical Volume / Filesystem

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LVM: Extend an existing Logical Volume / Filesystem

```
# Tested on RHEL 5, 6 & 7

# Concatenated volume
# -----
-----

MNTPT=/testmntpt
SIZE=500          # Size to add in Mbytes

VG=`mount | awk '{if ( $3 == "'$MNTPT'" ) print$1}' | cut -f4 -d '/' | cut -f1 -d
'_'`
LV=`mount | awk '{if ( $3 == "'$MNTPT'" ) print$1}' | cut -f4 -d '/' | cut -f2 -d
'_'`

df -h $MNTPT
Filesystem              Size  Used Avail Use% Mounted on
/dev/mapper/testvg-testlv
                        485M   11M  449M   3% /testmntpt

lvs | grep $LV
testlv    testvg -wi-ao--- 500.00m

# First, verify if there is enough free space in the VG

vgdisplay $VG | grep Free
Free  PE / Size          391 / 1.53 GiB
```

```
# Then, extend LV. Here size is given in Mbytes. To specify size in Logical Extents use '-l'
```

```
lvextend -L +$SIZE /dev/$VG/$LV
```

```
# ** Size to be added to volume may be specified as a percentage of remaining free space of
```

```
# the volume group like this (in this case we take all available free space):
```

```
#
```

```
# lvextend -l +100%FREE -n /dev/$VG/$LV
```

```
lvs | grep $LV
```

```
testlv    testvg -wi-ao--- 1012.00m
```

```
# Finally, extend filesystem
```

```
# For ext2/ext3 on RHEL 5 and ext2/ext3/ext4 on RHEL 6 & RHEL 7:
```

```
resize2fs -p /dev/$VG/$LV
```

```
resize2fs 1.41.12 (17-May-2010)
```

```
Filesystem at /dev/testvg/testlv is mounted on /testmntpt; on-line resizing required
```

```
old desc_blocks = 2, new_desc_blocks = 4
```

```
Performing an on-line resize of /dev/testvg/testlv to 1036288 (1k) blocks.
```

```
The filesystem on /dev/testvg/testlv is now 1036288 blocks long.
```

```
# *** For ext4 F.S. on RHEL 5:
```

```
# resize4fs -p /dev/$VG/$LV
```

```
# *** For xfs F.S.:
```

```
# xfs_growfs -d /dev/$VG/$LV
```

```
df -h $MNTPT
```

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/testvg-testlv					
	981M	11M	920M	2%	/testmntpt

```
# Striped volume
```

```
# -----  
-----
```

```
MNTPT=/testmntpt
```

```
SIZE=256                                # Size to add in Mbytes
```

```
VG=`mount | awk '{if ( $3 == "$MNTPT" ) print$1}' | cut -f4 -d '/' | cut -f1 -d  
'_`
```

```
LV=`mount | awk '{if ( $3 == "$MNTPT" ) print$1}' | cut -f4 -d '/' | cut -f2 -d  
'_`
```

```
df -h $MNTPT
```

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/testvg-testlv	504M	17M	462M	4%	/testmntpt

```
lvs | grep $LV
```

```
testlv   testvg -wi-ao--- 512.00m
```

```
# First, verify free space on volume group and disks
```

```
vgdisplay -v $VG
```

```
[...]
```

```
Free  PE / Size          388 / 1.52 GiB
```

```
[...]
```

```
--- Physical volumes ---
```

```
PV Name          /dev/sde1                      <--- Used
```

```
PV UUID          DFfnXR-fjK3-V5Tz-oFHM-Py1T-rW4G-2DUz4f
```

```
PV Status        allocatable
```

```
Total PE / Free PE  129 / 65
```

```
PV Name          /dev/sde2                      <--- Used
```

```
PV UUID          nQ307h-N8wH-FN9v-jmXu-5j5c-KZ25-IMUmGt
```

```
PV Status        allocatable
```

```
Total PE / Free PE  129 / 65
```

```
PV Name          /dev/sde3
```

```
PV UUID          CT1trl-90zb-afrY-bCAM-0Xas-3Shs-hLCw2m
```

```
PV Status        allocatable
```

```
Total PE / Free PE  129 / 129
```

```
PV Name          /dev/sde4
```

```
PV UUID          anN3BB-pafi-0ZE9-lp0w-Q0iL-EPiF-EQTUT0
```

```
PV Status        allocatable
```

```
Total PE / Free PE  129 / 129
```

```
# Then, extend LV. Here size is given in Mbytes. To specify size in Logical Extents use '-l'
```

```
# We'll try to keep the distribution regarding striping over disks. In this case I'm adding  
# 256M and there is enough space on disks in use so it is not necessary to specify disks as  
# LVM will be able to allocate extents directly on them:
```

```
lvextend -L +$SIZE /dev/$VG/$LV  
Extending logical volume testlv to 768.00 MiB  
Logical volume testlv successfully resized
```

```
# Let's check what we did:
```

```
vgdisplay -v $VG | egrep "VG Name|Free|PV Name"  
VG Name                testvg  
Free  PE / Size        324 / 1.27 GiB  
VG Name                testvg  
PV Name                /dev/sde1      <--- Used  
Total PE / Free PE    129 / 33  
PV Name                /dev/sde2      <--- Used  
Total PE / Free PE    129 / 33  
PV Name                /dev/sde3  
Total PE / Free PE    129 / 129  
PV Name                /dev/sde4  
Total PE / Free PE    129 / 129
```

```
# Otherwise, if we want to add extents on specific disks, we may do it (Let's add  
256  
# additional MiB):
```

```
SIZE=256  
DISKS="/dev/sde3 /dev/sde4"
```

```
lvextend -L +$SIZE /dev/$VG/$LV $DISKS  
Extending logical volume testlv to 1.00 GiB  
Logical volume testlv successfully resized
```

```
vgdisplay -v $VG | egrep "VG Name|Free|PV Name"  
VG Name                testvg  
Free  PE / Size        260 / 1.02 GiB  
VG Name                testvg  
PV Name                /dev/sde1  
Total PE / Free PE    129 / 33  
PV Name                /dev/sde2
```

```
Total PE / Free PE    129 / 33
PV Name                /dev/sde3    <--- Used
Total PE / Free PE    129 / 97
PV Name                /dev/sde4    <--- Used
Total PE / Free PE    129 / 97
```

If we don't indicate disks, system will try to allocate extents on disks that were used

during the last 'extend' operation:

SIZE=256

```
lvextend -L +$SIZE /dev/$VG/$LV
Extending logical volume testlv to 1.25 GiB
Logical volume testlv successfully resized
```

```
vgdisplay -v $VG | egrep "VG Name|Free|PV Name"
VG Name                testvg
Free  PE / Size        196 / 784.00 MiB
VG Name                testvg
PV Name                /dev/sde1
Total PE / Free PE    129 / 33
PV Name                /dev/sde2
Total PE / Free PE    129 / 33
PV Name                /dev/sde3    <--- Used
Total PE / Free PE    129 / 65
PV Name                /dev/sde4    <--- Used
Total PE / Free PE    129 / 65
```

Finally, if there is no enough free space on disks that were used last, system will first

fill them up and then will allocate extents on the other disks

SIZE=725

```
lvextend -L +$SIZE /dev/$VG/$LV
Extending logical volume testlv to 1.96 GiB
Logical volume testlv successfully resized
```

```
vgdisplay -v $VG | egrep "VG Name|Free|PV Name"
VG Name                testvg
Free  PE / Size        14 / 56.00 MiB
VG Name                testvg
PV Name                /dev/sde1    <--- Used step 2
```

```
Total PE / Free PE    129 / 7
PV Name                /dev/sde2    <--- Used step 2
Total PE / Free PE    129 / 7
PV Name                /dev/sde3    <--- Used step 1
Total PE / Free PE    129 / 0
PV Name                /dev/sde4    <--- Used step 1
Total PE / Free PE    129 / 0
```

Let's see extent distribution:

lvdisplay -m \$VG/\$LV

[...]

--- Segments ---

Logical extent 0 to 191:

```
  Type                striped
  Stripes              2
  Stripe size          64.00 KiB
  Stripe 0:
    Physical volume    /dev/sde1    <--- 1st extension
    Physical extents    0 to 95
  Stripe 1:
    Physical volume    /dev/sde2    <--- 1st extension
    Physical extents    0 to 95
```

Logical extent 192 to 449:

```
  Type                striped
  Stripes              2
  Stripe size          64.00 KiB
  Stripe 0:
    Physical volume    /dev/sde3    <--- 2nd and 3rd extensions
    Physical extents    0 to 128
  Stripe 1:
    Physical volume    /dev/sde4    <--- 2nd and 3rd extensions
    Physical extents    0 to 128
```

Logical extent 450 to 501:

```
  Type                striped
  Stripes              2
  Stripe size          64.00 KiB
  Stripe 0:
    Physical volume    /dev/sde1    <--- 4th extension
    Physical extents    96 to 121
  Stripe 1:
    Physical volume    /dev/sde2    <--- 4th extension
```

Physical extents 96 to 121

Anyway, try to maintain a "logical" distribution when extending a striped volume

lvs | grep \$LV

testlv testvg -wi-a---- 1.96g

Finally, extend filesystem

For ext2/ext3 on RHEL 5 and ext2/ext3/ext4 on RHEL 6 & RHEL 7:

resize2fs -p /dev/\$VG/\$LV

resize2fs 1.42.9 (28-Dec-2013)

Filesystem at /dev/testvg/testlv is mounted on /testmntpt; on-line resizing required

old_desc_blocks = 1, new_desc_blocks = 1

The filesystem on /dev/testvg/testlv is now 514048 blocks long.

*** For ext4 F.S. on RHEL 5:

resize4fs -p /dev/\$VG/\$LV

*** For xfs F.S.:

xfs_growfs -d /dev/\$VG/\$LV

df -h \$MNTPT

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/testvg-testlv	2.0G	788K	1.9G	1%	/testmntpt

Mirrored volume

MNTPT=/testmntpt

SIZE=128 # Size to add in Mbytes

VG=`mount | awk '{if ( \$3 == "'\$MNTPT'" ) print\$1}' | cut -f4 -d '/' | cut -f1 -d ' '`

LV=`mount | awk '{if ( \$3 == "'\$MNTPT'" ) print\$1}' | cut -f4 -d '/' | cut -f2 -d ' '`

```
df -h $MNTPT
```

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/testvg-testlv	248M	11M	226M	5%	/testmntpt

```
lvs | grep $LV
```

testlv	testvg mwi-aom--	256.00m		testlv_mlog	100.00
--------	------------------	---------	--	-------------	--------

```
# First, verify free space on volume group and disks
```

```
vgdisplay -v $VG
```

```
[...]
```

```
Free PE / Size          387 / 1.51 GiB
```

```
[...]
```

```
--- Physical volumes ---
```

PV Name	/dev/sde1	<--- Used
PV UUID	DFfnXR-fjK3-V5Tz-oFHM-Py1T-rW4G-2DUz4f	
PV Status	allocatable	
Total PE / Free PE	129 / 65	

PV Name	/dev/sde2	<--- Used
PV UUID	nQ307h-N8wH-FN9v-jmXu-5j5c-KZ25-IMUmGt	
PV Status	allocatable	
Total PE / Free PE	129 / 64	

PV Name	/dev/sde3	
PV UUID	CT1trl-90zb-afrY-bCAM-0Xas-3Shs-hLCw2m	
PV Status	allocatable	
Total PE / Free PE	129 / 129	

PV Name	/dev/sde4	
PV UUID	anN3BB-pafi-0ZE9-lpOw-Q0iL-EPiF-EQTUT0	
PV Status	allocatable	
Total PE / Free PE	129 / 129	

```
# Then, extend LV. Here size is given in Mbytes. To specify size in Logical Extents use '-l'
```

```
# We'll try to keep the distribution regarding mirroring over disks. In this case I'm adding
```

```
# 128M and there is enough space on disks in use so it is not necessary to specify disks as
```

```
# LVM will be able to allocate extents directly on them:
```



```
lvextend -L +$SIZE /dev/$VG/$LV
```

```
Extending 2 mirror images.
```

```
Extending logical volume testlv to 384.00 MiB
```

```
Logical volume testlv successfully resized
```

```
# Let's check what we did:
```

```
vgdisplay -v $VG | egrep "VG Name|Free|PV Name"
```

```
VG Name          testvg
Free  PE / Size  323 / 1.26 GiB
VG Name          testvg
PV Name          /dev/sde1      <--- Used
Total PE / Free PE  129 / 33
PV Name          /dev/sde2      <--- Used
Total PE / Free PE  129 / 32
PV Name          /dev/sde3
Total PE / Free PE  129 / 129
PV Name          /dev/sde4
Total PE / Free PE  129 / 129
```

```
# Otherwise, if we want to add extents on specific disks, we may do it (Let's add
256
```

```
# additional MiB):
```

```
SIZE=256
```

```
DISKS="/dev/sde3 /dev/sde4"
```

```
lvextend -L +$SIZE /dev/$VG/$LV $DISKS
```

```
Extending 2 mirror images.
```

```
Extending logical volume testlv to 640.00 MiB
```

```
Logical volume testlv successfully resized
```

```
vgdisplay -v $VG | egrep "VG Name|Free|PV Name"
```

```
VG Name          testvg
Free  PE / Size  195 / 780.00 MiB
VG Name          testvg
PV Name          /dev/sde1
Total PE / Free PE  129 / 33
PV Name          /dev/sde2
Total PE / Free PE  129 / 32
PV Name          /dev/sde3      <--- Used
Total PE / Free PE  129 / 65
PV Name          /dev/sde4      <--- Used
Total PE / Free PE  129 / 65
```

```
# If we don't indicate disks, system will try to allocate extents on disks that
were used
# during the last 'extend' operation:
```

SIZE=250

```
lvextend -L +$SIZE /dev/$VG/$LV
```

Extending 2 mirror images.

Extending logical volume testlv to 892.00 MiB

Logical volume testlv successfully resized

```
vgdisplay -v $VG | egrep "VG Name|Free|PV Name"
```

VG Name	testvg	
Free PE / Size	69 / 276.00 MiB	
VG Name	testvg	
PV Name	/dev/sde1	
Total PE / Free PE	129 / 33	
PV Name	/dev/sde2	
Total PE / Free PE	129 / 32	
PV Name	/dev/sde3	<--- Used
Total PE / Free PE	129 / 2	
PV Name	/dev/sde4	<--- Used
Total PE / Free PE	129 / 2	

```
# Finally, if there is no enough free space on disks that were used last, system
will first
```

```
# fill them up and then will allocate extents on the other disks
```

SIZE=128

```
lvextend -L +$SIZE /dev/$VG/$LV
```

Extending 2 mirror images.

Extending logical volume testlv to 1020.00 MiB

Logical volume testlv successfully resized

```
vgdisplay -v $VG | egrep "VG Name|Free|PV Name"
```

VG Name	testvg	
Free PE / Size	5 / 20.00 MiB	
VG Name	testvg	
PV Name	/dev/sde1	<--- Used step 2
Total PE / Free PE	129 / 3	
PV Name	/dev/sde2	<--- Used step 3
Total PE / Free PE	129 / 2	
PV Name	/dev/sde3	<--- Used step 1
Total PE / Free PE	129 / 0	

```

PV Name                /dev/sde4      <--- Used step 1
Total PE / Free PE    129 / 0

# Anyway, try to maintain a "logical" distribution when extending a mirrored volume

lvs | grep $LV
    testlv      testvg mwi-aom-- 1020.00m                testlv_mlog    100.00

# Finally, extend filesystem

# For ext2/ext3 on RHEL 5 and ext2/ext3/ext4 on RHEL 6 & RHEL 7:

resize2fs -p /dev/$VG/$LV
    resize2fs 1.41.12 (17-May-2010)
    Filesystem at /dev/testvg/testlv is mounted on /testmntpt; on-line resizing
required
    old_desc_blocks = 1, new_desc_blocks = 4
    Performing an on-line resize of /dev/testvg/testlv to 1044480 (1k) blocks.
    The filesystem on /dev/testvg/testlv is now 1044480 blocks long.

# *** For ext4 F.S. on RHEL 5:
# resize4fs -p /dev/$VG/$LV

# *** For xfs F.S.:
# xfs_growfs -d /dev/$VG/$LV

df -h $MNTPT
Filesystem                Size  Used Avail Use% Mounted on
/dev/mapper/testvg-testlv
                        988M   11M   926M   2% /testmntpt

```

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