

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-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 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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