LVM Logical volumes

CONCEPTS

Disks become PVs, PVs pool into a VG, and you carve LVs out of the VG. An LV is a block device: put a filesystem on it.

Disk / partition /dev/sdb1
↓ pvcreate
Physical volume PV
↓ vgcreate
Volume group VG, pool of extents
↓ lvcreate
Logical volume /dev/<vg>/<lv>

Space is handed out in extents (4 MiB by default). Sizes are rounded to whole extents.

INSPECT

pvs
List physical volumes

vgs
List volume groups with free space

lvs
List logical volumes

lvs -a -o +devices
Show LVs and the PVs they use

lsblk
Show the block device tree

PHYSICAL VOLUMES

pvcreate *<dev>*...
Initialise a disk or partition

pvresize *<dev>*
Grow a PV after the disk got bigger

pvmove *<old-pv>* [*<new-pv>*]
Move all extents off a PV

VOLUME GROUPS

vgcreate *<vg>* *<pv>*...
Create a VG from PVs

vgextend *<vg>* *<pv>*...
Add PVs to a VG

vgreduce *<vg>* *<pv>*
Remove an empty PV from a VG

vgchange -ay *<vg>*
Activate all LVs in a VG

LOGICAL VOLUMES

lvcreate -L *<size>* **-n** *<lv>* *<vg>*
Create an LV of a fixed size

lvcreate -l 100%FREE -n *<lv>* *<vg>*
Create an LV from all free space

mkfs.ext4 /dev/*<vg>*/*<lv>*
Put a filesystem on the LV

mount /dev/*<vg>*/*<lv>* *<dir>*
Mount the LV

lvremove *<vg>*/*<lv>*
Delete an LV (data is lost)

lvchange -ay *<vg>*/*<lv>*
Activate an LV

RESIZE

lvextend -L +*<size>* *<vg>*/*<lv>*
Grow an LV by an amount

lvextend -l +100%FREE *<vg>*/*<lv>*
Grow an LV into all free space

lvextend -r -L +*<size>* *<vg>*/*<lv>*
Grow the LV and its filesystem

lvresize -r -L -*<size>* *<vg>*/*<lv>*
Shrink LV and filesystem together

resize2fs /dev/*<vg>*/*<lv>*
Grow an ext4 fs to fill its LV

xfs_growfs *<mountpoint>*
Grow a mounted XFS fs

Shrinking order: unmount, fsck, shrink the filesystem, then reduce the LV, never the other way round. Prefer lvresize -r and take a backup first.

SNAPSHOTS

lvcreate -s -L *<size>* **-n** *<snap>* *<vg>*/*<lv>*
Snapshot an LV

lvconvert --merge *<vg>*/*<snap>*
Roll the origin back to a snapshot

RECIPES

New data disk to mounted volume

```
pvcreate /dev/sdb
vgcreate data /dev/sdb
lvcreate -l 100%FREE -n files data
mkfs.ext4 /dev/data/files
mount /dev/data/files /srv/files
```