

Работа с дисками lvm

Команды с описанием

`df -h` - отображает статус дисков в файловой системе

`fdisk -l` - показать какие есть диски

`lsblk` - показать какие есть диски

`cfdisk /dev/sdb` - редактирование раздела sdb

`/etc/fstab` - тут прописываем новые диски

`mount /media/hdd2` - присоединяет диск, прописанный в файле *fstab* с именем *hdd2*

Обновление инфы о дисках

```
echo 1 > /sys/block/sda/device/rescan
```

```
echo "- - -" | tee /sys/class/scsi_host/host*/scan
```

How to add an extra second hard drive on Linux LVM and increase the size of storage

I have 250GB disk installed on my home Linux server. I just bought a brand new 250GB SATA disk and I want to add a new disk to my existing LVM volume to increase its size total size to 500GB. How do I add a disk to LVM and extend an LVM volume on Linux operating system?

Logical volume management (LVM) creates an easy to use layer over physical disks. You can combine multiple disks and create logical storage volumes. This provides specific benefits such as:

1. No restriction on disk size
2. Increased disk throughput
3. Mirroring volumes for business critical data
4. Volume snapshots
5. Easy backups and restores using snapshots
6. Easy data relocation
7. Resizing storage pools (add or remove disks) without reformatting disks

This tutorial **shows you how to make partitioning, formatting, and add a new disk to LVM volume on Linux**. For demo purpose, I am using Ubuntu VM, but the commands remain same for bare metal or any other virtualization technology such as KVM, Xen, VMware and so on.

Warning: Be careful with `lvm/mkfs.ext4` and other commands, and device names as wrong device name can wipe out all data. **Proceed with caution** and always keep full backups. The nixCraft or author is not responsible for data loss.

Step 1 – Find out information about existing LVM

LVM Storage Management divided into three parts:

1. **Physical Volumes (PV)** – Actual disks (e.g. `/dev/sda`, `/dev/sdb`, `/dev/vdb` and so on)
2. **Volume Groups (VG)** – Physical volumes are combined into volume groups. (e.g. `my_vg = /dev/sda + /dev/sdb`.)
3. **Logical Volumes (LV)** – A volume group is divided up into logical volumes (e.g. `my_vg` divided into `my_vg/data`, `my_vg/backups`, `my_vg/home`, `my_vg/mysql` and so on)

Type the following commands to find out information about each part.

How to display physical volumes (pv)

Type the following pvs command to see info about physical volumes:

```
$ sudo pvs
```

Sample outputs:

[Fig.01: How to display information about LVM physical volumes](#)

Fig.01: How to display information about LVM physical volumes

So currently my LVM include a physical volume (actual disk) called /dev/vda5. To see detailed attributes information, type:

```
$ sudo pvdisplay
```

Sample outputs:

[Fig.02: See attributes of a physical volume \(PV\)](#)

Fig.02: See attributes of a physical volume (PV)

From above output it is clear that our volume group named ubuntu-box-1-vg is made of a physical volume named /dev/vda5.

How to display information about LVM volume Groups (vg)

Type any one of the following vgs command/vgdisplay command to see information about volume groups and its attributes:

```
$ sudo vgs
```

OR

```
$ sudo vgdisplay
```

Sample outputs:

[Fig.03: How to see information about LVM volume groups \(vg\)](#)

Fig.03: How to see information about LVM volume groups (vg)

How to display information about LVM logical volume (lv)

Type any one of the following lvs command/lvdisplay command to see information about volume groups and its attributes:

```
$ sudo lvs
```

OR

```
$ sudo lvdisplay
```

Sample outputs:

Fig.04: How to display information about logical volumes (lv)

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My ubuntu-box-1-vg volume group divided into two logical volumes:

1. /dev/ubuntu-box-1-vg/root – Root file system
2. /dev/ubuntu-box-1-vg/swap_1 – Swap space

Based upon above commands, you can get a basic idea how LVM organizes storage device into Physical Volumes (PV), Volume Groups (VG), and Logical Volumes (LV):

Fig.05: How LVM organizes storage device into Physical Volumes (PV), Volume Groups (VG), & Logical Volumes (LV)

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Step 2 – Find out information about new disk

You need to add a new disk to your server. In this example, for demo purpose I added a new disk drive, and it has 5GiB size. To find out information about new disks run:

```
$ sudo fdisk -l
```

OR

```
$ sudo fdisk -l | grep '^Disk /dev/'
```

Sample outputs:

Fig.06: Find out installed disk names on Linux

Fig.06: Find out installed disk names on Linux

Another option is to scan for all devices visible to LVM2:

```
$ sudo lvmdiskscan
```

Sample outputs:

```
/dev/ram0          [      64.00 MiB]
/dev/ubuntu-box-1-vg/root [    37.49 GiB]
/dev/ram1          [      64.00 MiB]
/dev/ubuntu-box-1-vg/swap_1 [     2.00 GiB]
/dev/vda1          [    487.00 MiB]
/dev/ram2          [      64.00 MiB]
/dev/ram3          [      64.00 MiB]
```

```
/dev/ram4          [      64.00 MiB]
/dev/ram5          [      64.00 MiB]
/dev/vda5          [     39.52 GiB] LVM physical volume
/dev/ram6          [      64.00 MiB]
/dev/ram7          [      64.00 MiB]
/dev/ram8          [      64.00 MiB]
/dev/ram9          [      64.00 MiB]
/dev/ram10         [      64.00 MiB]
/dev/ram11         [      64.00 MiB]
/dev/ram12         [      64.00 MiB]
/dev/ram13         [      64.00 MiB]
/dev/ram14         [      64.00 MiB]
/dev/ram15         [      64.00 MiB]
/dev/vdb           [       5.00 GiB]
2 disks
18 partitions
0 LVM physical volume whole disks
1 LVM physical volume
```

Step 3 – Create physical volumes (pv) on new disk named /dev/vdb

Type the following command:

```
$ sudo pvcreate /dev/vdb
```

Sample outputs:

```
Physical volume "/dev/vdb" successfully created
```

Now run the following command to verify:

```
$ sudo lvm diskscan -l
```

Sample outputs:

```
WARNING: only considering LVM devices
/dev/vda5          [     39.52 GiB] LVM physical volume
/dev/vdb           [       5.00 GiB] LVM physical volume
1 LVM physical volume whole disk
1 LVM physical volume
```

Step 4 – Add newly created pv named /dev/vdb to an existing lv

Type the following command to add a physical volume /dev/vdb to “ubuntu-box-1-vg” volume group:

```
$ sudo vgextend ubuntu-box-1-vg /dev/vdb
```

Sample outputs:

```
Volume group "ubuntu-box-1-vg" successfully extended
```

Finally, you need extend the /dev/ubuntu-box-1-vg/root to create total 45GB (/dev/vdb (5G)+ existing /dev/ubuntu-box-1-vg/root (40G))

```
$ sudo lvm lvextend -l +100%FREE /dev/ubuntu-box-1-vg/root
```

Sample outputs:

```
Size of logical volume ubuntu-box-1-vg/root changed from 37.49 GiB (9597 extents) to 42.52 GiB (10400 extents).
Logical volume root successfully resized.
```

However, if you run `df -h` or any other command you will still see /dev/ubuntu-box-1-vg/root as 40G. You need to run the following command to enlarge the filesystem created inside the “root” volume:

```
$ sudo resize2fs -p /dev/mapper/ubuntu--box--1--vg-root
```

Sample outputs:

```
resize2fs 1.42.13 (17-May-2015)
Filesystem at /dev/mapper/ubuntu--box--1--vg-root is mounted on /; on-line resizing required
old_desc_blocks = 3, new_desc_blocks = 3
The filesystem on /dev/mapper/ubuntu--box--1--vg-root is now 11146240 (4k) blocks long.
```

Verify it again using the [df command](#) or mount command. For example:

```
$ mount
```

```
$ mount | grep '/dev/mapper/ubuntu'
```

OR

```
$ df -H
```

Sample outputs:

Filesystem	Size	Used	Avail	Use%	Mounted on
udev	1.1G	0	1.1G	0%	/dev
tmpfs	146M	12M	135M	9%	/run
/dev/mapper/ubuntu--box--1--vg-root	45G	2.3G	41G	6%	/
tmpfs	512M	0	512M	0%	/dev/shm
tmpfs	5.3M	0	5.3M	0%	/run/lock
tmpfs	512M	0	512M	0%	/sys/fs/cgroup
/dev/vda1	495M	109M	361M	24%	/boot
tmpfs	103M	0	103M	0%	/run/user/0