

? RHEL5 ??????? LVM ?????? #system-config-lvm

LVM:????

?????????LVM????,?????????????.

**Physical Volume (PV)**

A physical volume is typically a hard disk, though it may well just be a device that 'looks' like a hard disk (eg. a software raid device).

?????????????partition(/dev/sdb1,/dev/sdc1)

**volume group (VG)**

The Volume Group is the highest level abstraction used within the LVM. It gathers together a collection of Logical Volumes and Physical Volumes into one administrative unit.

???????? PV(/dev/sdb1,/dev/sdc1)????????????????(/dev/volum00,?????????/dev/sda?????????,????????? ??????????)

**Logical Volume (LV)**

The equivalent of a disk partition in a non-LVM system. The LV is visible as a standard block device; as such the LV can contain a file system (eg. /home).

?VG????????????? partition(/dev/volum00/LVOL1,?????????/dev/sda1?????????,?????????????????)

**Physical Extent (PE)**

Each physical volume is divided chunks of data, known as physical extents, these extents have the same size as the logical extents for the volume group.

PE????????????,??block???.? PE????????4M??VG????65534?PE,????????,??VG????65534\*4M??256G.????  
 ??????????????.??????PE?????.????4M????2????8k-16GB????????.

LVM ???????:

?????????? partition(/dev/sdb1 /dev/sdc1) ??????????(/dev/vg).?????????????????????? partition(/dev/vg/  
 lv1,/dev/vg/lv2).???????? partition ???.

### ???????? LVM2

???????????????? LVM ???, RHEL5 ????? LVM ????.? LVM ?????,???????????? LVM2 ,??? 3 ???????.

1. ?? device-mapper ??????????????,???????? Multi-device support (RAID and LVM) ?.

```
[root@benjr ~]# cat /boot/config-kernel-version | grep -i BLK_DEV_DM
CONFIG_BLK_DEV_DM=m
```

2.device-mapper ? library (libdevmapper)

```
[root@benjr ~]# rpm -aq |grep -i device-mapper
device-mapper-version
```

3.LVM2 ???

```
[root@benjr ~]# rpm -aq |grep -i lvm  
lvm2-version
```

### Physical Volume (PV) ???

PV ?????? partition ?? #system-config-lvm ?????? PV ??? sdb ??? "initialize Entity.????????????? ????????????

<http://benjr.tw/?q=node/55>

### Volume Group (VG) ???

?? PV ?????? VG ,? Unallocated Volumes ?????? PV,?? "Create new Volume Group" ????? VG ??????5?.

**Volume Group Name:**

????????? volume ????(/dev/Volume Group Name/Logical Volume Name).

**Maximum Physical Volumes:**

????????????????????(PV),?????? PV ??????,??256???????

**Maximum Logical Volumes:**

????????? LV ???,??? 256,???????????????????

**Physical Extent Size:**

PE ???? VG ???,????????????? PE ?????????2?????8k-1GB?????????,???? 4M.

**Clustered:**

???? volume ??? Cluster ??????????,???????????????????????????????

**Logical Volume (LV) ???**

???? VG ? vg1 ? Volume Groups ?????,????????? LV,?? "Create New Logical Voumes"

**LV name:**

????????? voulme ????(/dev/Volume Group Name/Logical Volume Name)

**LV Properties:**

LVM ??????????( mapping )??,1.Linear 2.Mirrored 3.Striped ??? Linear ?????????? PV(Physical Volume) ?????  
 ?.???? VG(Volume Group) ??? PV(Physical Volume) ?????????? 2.Mirrored 3.Striped ??? RAID ?????,??????  
 ? Soft RAID ? ?? .Mirrored ??? RAID 1 ,Striped ??? RAID 0.

**1.Linear**

????????????? sdb1,sdc1????? Linear LVM Disk,????????????????,? sdb1 ?????????? sdc1 ??????.

**2.Mirrored**

???????????? sdb1,sdc1????? Mirrored LVM Disk,???????????????? sdb1 sdc1 ??????????.????? RAID 1.?????????????????  
??.

**3.Striped**

???????????? sdb1,sdc1????? Striped LVM Disk,????????????????sdb1 ,sdc1 ?????.????? RAID 0.????????????????????????????

?????????????.????????????????????.

**Size:**

????? LV(Logical Volume) ??????,?? LVM ?????????????????????,?????????????????.??? :1.Extents 2.Gigabytes  
3.Megabytes 4.Kilobytes.?? Extents ?????????????????????(G/M/K Bytes,1G=10<sup>9</sup> ,1M=10<sup>6</sup>1K=10<sup>3</sup>) ?????????  
**Physical Extent Size** ?????????,Extents ?????????????????? 4MBytes.

**User remaining:**

???VG(volume group)????????????? LV(Logical Volume)

**Filesystem:**

????? LV ?????????????????????,????????? None,????????? Ext3 / Ext2 / GFS(local) / GFS(Clusterd) ,Global File  
System ??????????,????? Ext3 ??.

**Mount point:**

????????????????????? LV(Logical Volume) ??(mount)?????????. "mount when rebooted" ??????????????????????  
LV(Logical Vlolume) ??????????,????????? /etc/fstab ??? ????????????????????? say "yes" ??????????????????.

**????? LV (Logical Volume)?????????**

???????? LVM(Logical Volume Manager) ?????????????????????????????????????,????????????????? #system-config-lvm  
?????????????.????????? LV1 ?????????? 20 GByte ?????????????????????????????????????? 40 Gbyte.

???????? LV(Logical Volume) ?????????,??????????????,????????????????????,??????????????????.

```

[root@benjr ~]# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/sda1       19G  6.4G  12G  36% /
tmpfs           1005M  0 1005M  0% /dev/shm
/dev/mapper/vg1-lv1  20G  173M  19G  1% /share
#?? LV(Logical Volume) ??
[root@benjr ~]# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/sda1       19G  6.4G  12G  36% /
tmpfs           1005M  0 1005M  0% /dev/shm
/dev/mapper/vg1-lv1  40G  177M  38G  1% /share
  
```

?????????????,????????????? (#umount) ,????????????,?? "resize2fs" ??????????,?
 ?? "/sbin/resize2fs:No space left on
 device while trying to resize /dev/vg1/lv1" ???????.



**???? VG(Volume Group)??????**

LV(Logical Volume) ????????? VG(Volume Group) ??????? LV(Logical Volume) ?????????,?????

VG(Volume Group) ??,?? VG(Volume Group.???????? /dev/sdb ????? /dev/sdc ,???????? PV ???,???? "Uninitialized Entities" ??,???????????????? "initialize Entity.?? sdc ? partition ???

PV(Physical Volume) .

??? PV(Physical Volume) ?????????????????? VG(Volume Group).???? PV ??? "Unallocated Volumes".?? "Add to existing volume Group" ?????????????? vg1.

?? Volume Groups ????? Physical View ??? sdb1 + sdc1 ?????????? "Properties for Volume Group" ? "Volume Group Size" ?????,??  
 LV(Logical Volume) ???????.

### **LVM mapping modes (linear/striped/mirrored)**

???? LV Properties ??? LVM ??????????( mapping )??,1.Linear 2.Mirrored 3.Striped ??? Linear ?????????????  
 Linear ,???????????? PV(Physical Volume) ??????.???? VG(Volume Group) ??? PV(Physical Volume) ??????????  
 ? 2.Mirrored 3.Striped ??? RAID ?????,????????? Soft RAID ? ??Mirrored ??? RAID 1 ,Striped ??? RAID 0.

???????????????????? sdb1 , sdc1 ,sdd1 ????????????????? VG(Volume Group).???? VG ? vg1 ? Volume Groups ?????,??  
 ?????? LV,?? "Create New Logical Voumes" Mirrored ? Striped ? LV(Logical Volume) ??????.

**Mirrored(RAID 1):**

????????????? Mirrored(RAID 1) ??? PV(Physical Volume) ???,????????????? PV(Physical Volume) ?? Mirrored  
Log,????????????????????? Log ?????????? #lvcreate -L 15G -m1 -n mirrored vg1 ??? Log ??????????????????????  
mirror ???.

**Striped(RAID 0):**

Striped(RAID 0)  $2^n$  PV(Physical Volume) VG(Volume Group) PV(Physical Volume)  $2^n$   
?,stripe size  $2^n$  (n=2 to 9). LV(Logical Volume) PV(Physical Volume) ?.

????????????? Mirrored ?????????????? PV(Physical Volume) ????? PV(Physical Volume) ?? Log.? Striped ??????????????  
PV(Physical Volume) ??????????.

?????,???? striped ???????.

```
[root@benjr ~]# hdparm -t /dev/vg1/mirrored
```

```
Timing buffered disk reads: 182 MB in 3.01 seconds = 60.49 MB/sec
```

```
HDIO_DRIVE_CMD(null) (wait for flush complete) failed: Inappropriate ioctl for device
```

```
[root@benjr ~]# hdparm -t /dev/vg1/striped
```

```
/dev/vg1/striped:
```

```
Timing buffered disk reads: 702 MB in 3.01 seconds = 233.54 MB/sec
```

```
HDIO_DRIVE_CMD(null) (wait for flush complete) failed: Inappropriate ioctl for device
```

## RHEL5 - LVM Snapshots

```
??? snapshot ,??? snapshot ?????????,????????????? LV(Logical Volume) ??,???? LV(Logical Volume) ????? LV(Logical Volume) ???,???
?????,snapshot ?????????????(copy on write),? LV(logical Volume) ????? snapshot ?.LV(Logical Volume) ? snapshot ?????????????,???
LV(Logical Volume) ? snapshot ?????????????,?? snapshot ?????????????.??? LV(Logical Volume) ?????????????,????????????? snapshot ,???
? LV(logical Volume) ???????????.
```

```
??? snapshot ??? dm-snapshot.
```

```
[root@benjr ~]# modprobe dm-snapshot
```

??? snapshot LV(logical Volume) ?????????????? VG(Volume Group),,???????? LV ??? 15-20 %

snapshot ?????????????? snapshot(?),????? snapshot ??????.??  
?????.LVM 1 sanpshot ????????? LVM2 ? snapshot ??????.

Snapshot ???

snapshot ?????? (partition) ??????????????. snapshot ?????????? /dev/vg1/stripped ??????(?,?,?)?,??????????  
?? /dev/vg1/snapshot ??,????????????????????????????????????!!

```
[root@benjr ~]# ls /database
total 13
-rw-r--r-- 1 root root 1 Apr 2 00:28 a.test.file
drwxr-xr-x 2 root root 12288 Apr 2 00:28 lost+found
[root@benjr ~]# ls /backup
total 13
-rw-r--r-- 1 root root 1 Apr 2 00:28 a.test.file
drwxr-xr-x 2 root root 12288 Apr 2 00:28 lost+found
```



????? /database ?? /backup??????,???? /database/a.test.file ??.

```
[root@benjr ~]# rm /database/a.test.file
[root@benjr ~]# ls /backup
total 13
-rw-r--r-- 1 root  root    1 Apr 2 00:28 a.test.file
drwxr-xr-x 2 root  root   12288 Apr 2 00:28 lost+found
```

???????? a.test.file ????? /dev/vg1/snapshot ?? ??? snapshot ?????????????.

note: