分区规划：思路：

物理磁盘---->划分分区---->格式化---->挂载使用

划分分区两种方案：

MBR：分区类型：**主分区　扩展分区　逻辑分区**

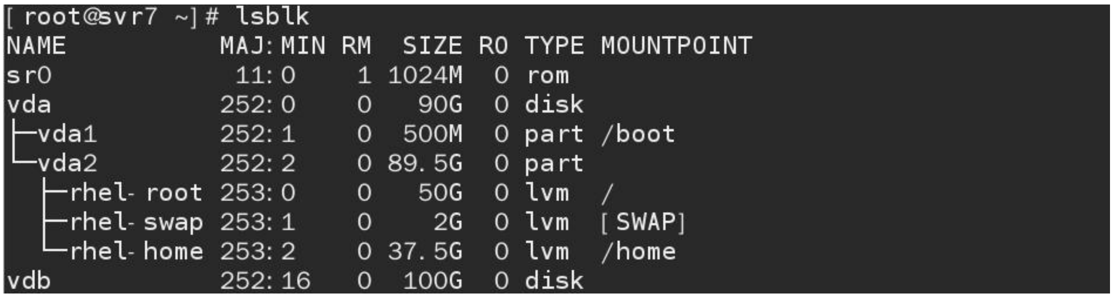
GPT：128 个主分区(2T 以上)

划分分区工具（命令）

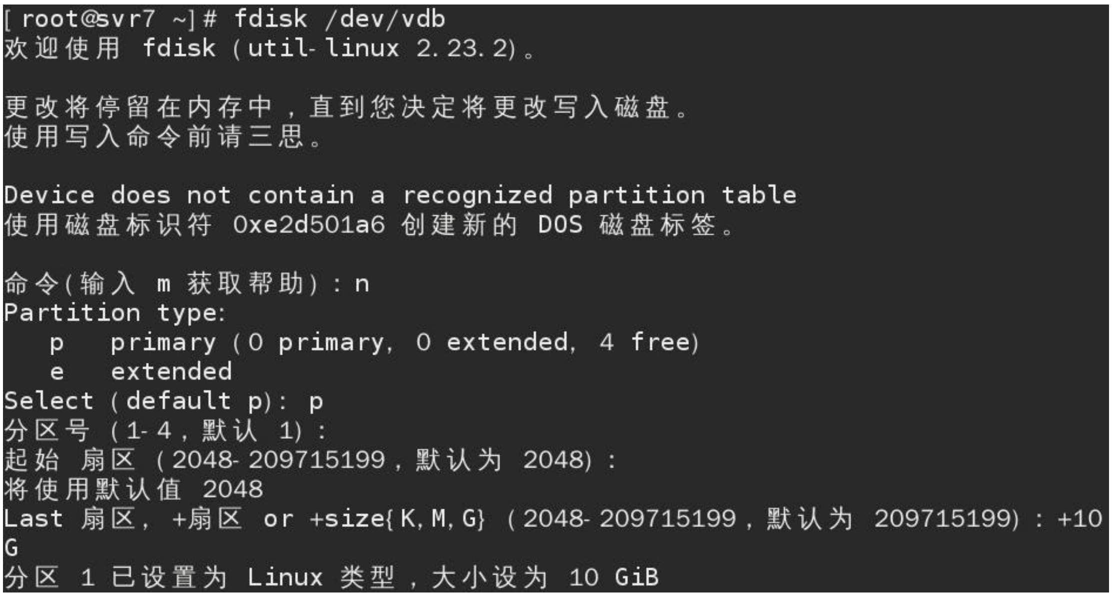
fdisk ----->MBR

parted ----->GPT

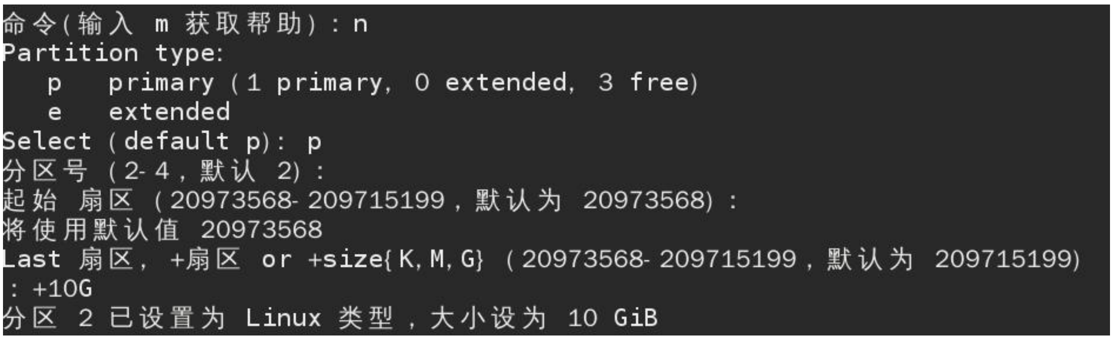
划分分区：3 个 10G 主分区，1 个 10G 的逻辑分区



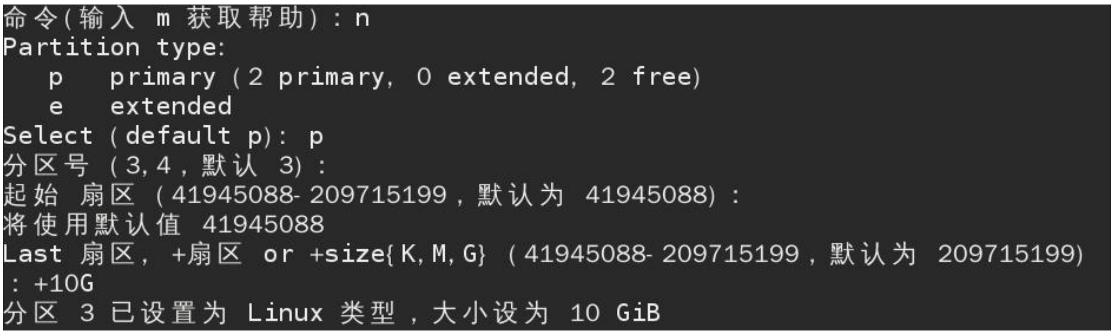
```
[root@svr7 ~]# lsblk
NAME            MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sr0              11:0    1 1024M  0 rom
vda             252:0    0   90G  0 disk
├─vda1          252:1    0  500M  0 part /boot
└─vda2          252:2    0 89.5G  0 part
  ├─rhel-root 253:0    0   50G  0 lvm  /
  ├─rhel-swap 253:1    0    2G  0 lvm  [SWAP]
  └─rhel-home 253:2    0 37.5G  0 lvm  /home
vdb             252:16   0  100G  0 disk
```



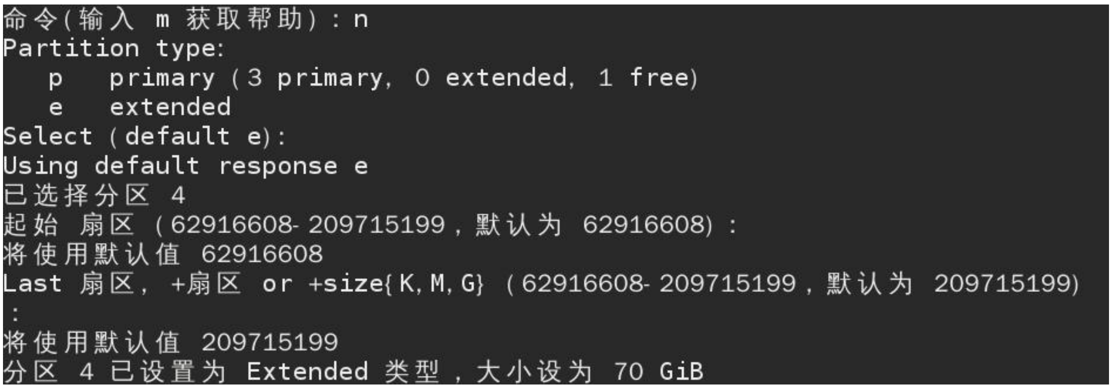
```
[root@svr7 ~]# fdisk /dev/vdb
欢迎使用 fdisk (util-linux 2.23.2)。

更改将停留在内存中，直到您决定将更改写入磁盘。
使用写入命令前请三思。

Device does not contain a recognized partition table
使用磁盘标识符 0xe2d501a6 创建新的 DOS 磁盘标签。

命令(输入 m 获取帮助)：n
Partition type:
   p   primary (0 primary, 0 extended, 4 free)
   e   extended
Select (default p): p
分区号 (1-4，默认 1)：
起始 扇区 (2048-209715199，默认为 2048)：
将使用默认值 2048
Last 扇区, +扇区 or +size{K,M,G} (2048-209715199，默认为 209715199)：+10
G
分区 1 已设置为 Linux 类型，大小设为 10 GiB
```



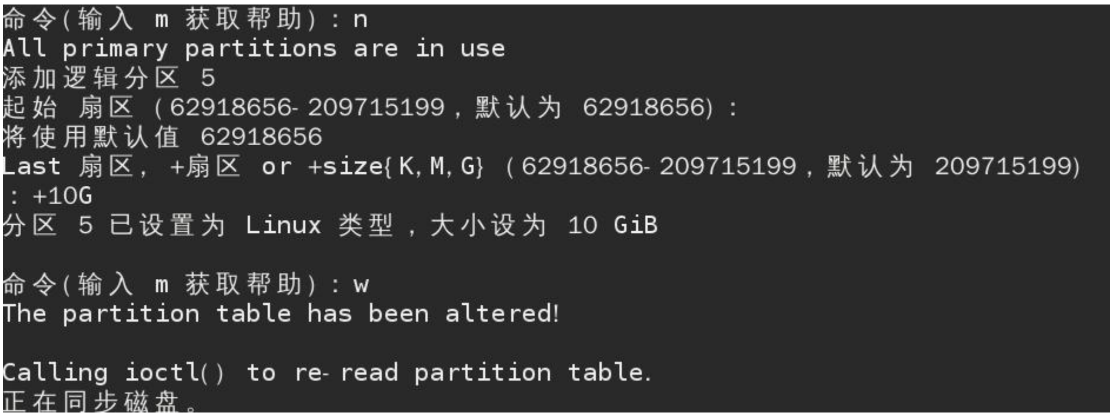
```
命令(输入 m 获取帮助)：n
Partition type:
   p   primary (1 primary, 0 extended, 3 free)
   e   extended
Select (default p): p
分区号 (2-4，默认 2)：
起始 扇区 (20973568-209715199，默认为 20973568)：
将使用默认值 20973568
Last 扇区, +扇区 or +size{K,M,G} (20973568-209715199，默认为 209715199)
：+10G
分区 2 已设置为 Linux 类型，大小设为 10 GiB
```



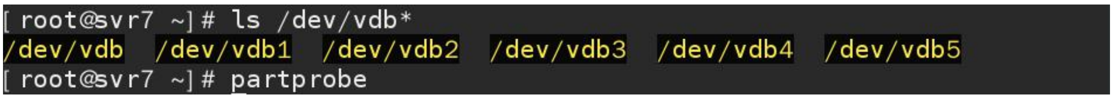
```
命令(输入 m 获取帮助)：n
Partition type:
   p   primary (2 primary, 0 extended, 2 free)
   e   extended
Select (default p): p
分区号 (3,4，默认 3)：
起始 扇区 (41945088-209715199，默认为 41945088)：
将使用默认值 41945088
Last 扇区, +扇区 or +size{K,M,G} (41945088-209715199，默认为 209715199)
：+10G
分区 3 已设置为 Linux 类型，大小设为 10 GiB
```



```
命令(输入 m 获取帮助)：n
Partition type:
   p   primary (3 primary, 0 extended, 1 free)
   e   extended
Select (default e):
Using default response e
已选择分区 4
起始 扇区 (62916608-209715199，默认为 62916608)：
将使用默认值 62916608
Last 扇区, +扇区 or +size{K,M,G} (62916608-209715199，默认为 209715199)
：
将使用默认值 209715199
分区 4 已设置为 Extended 类型，大小设为 70 GiB
```



```
命令(输入 m 获取帮助)：n
All primary partitions are in use
添加逻辑分区 5
起始 扇区 (62918656-209715199，默认为 62918656)：
将使用默认值 62918656
Last 扇区, +扇区 or +size{K,M,G} (62918656-209715199，默认为 209715199)
：+10G
分区 5 已设置为 Linux 类型，大小设为 10 GiB

命令(输入 m 获取帮助)：w
The partition table has been altered!

Calling ioctl() to re-read partition table.
正在同步磁盘。
```

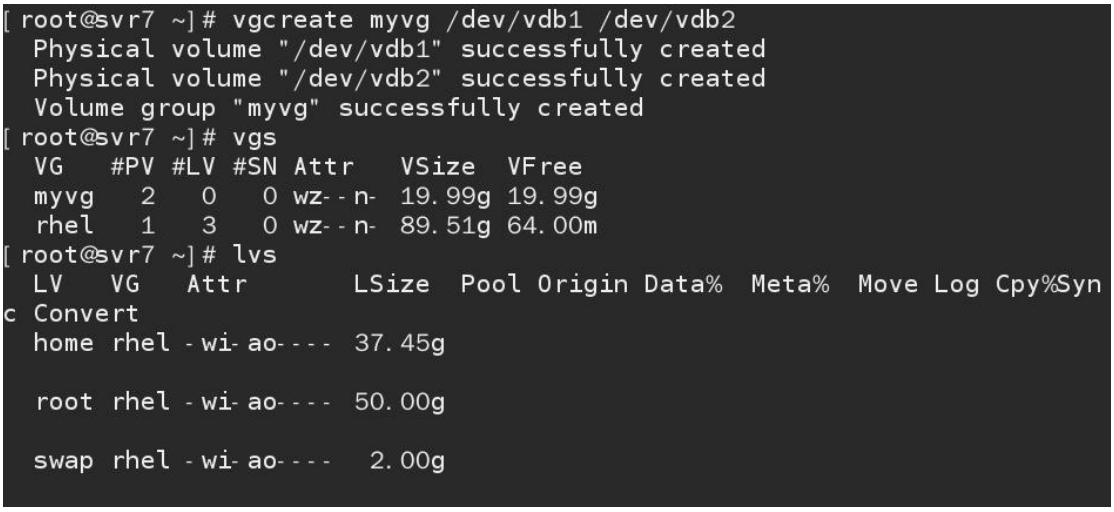


```
[root@svr7 ~]# ls /dev/vdb*
/dev/vdb  /dev/vdb1  /dev/vdb2  /dev/vdb3  /dev/vdb4  /dev/vdb5
[root@svr7 ~]# partprobe
```

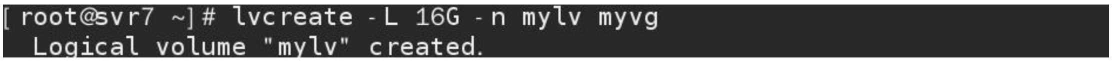
逻辑卷 Lvm

逻辑卷的作用：可以整合分散的空间；空间可以扩大

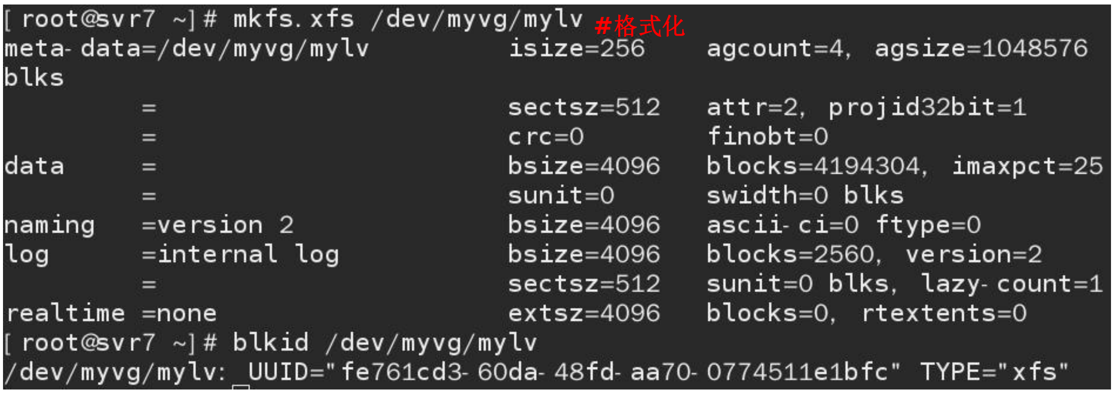
做逻辑卷的思路：将众多的物理卷组成卷组，再从卷组中划分逻辑卷



```
[root@svr7 ~]# vgcreate myvg /dev/vdb1 /dev/vdb2
  Physical volume "/dev/vdb1" successfully created
  Physical volume "/dev/vdb2" successfully created
  Volume group "myvg" successfully created
[root@svr7 ~]# vgs
  VG   #PV #LV #SN Attr   VSize  VFree
  myvg   2   0   0 wz--n- 19.99g 19.99g
  rhel   1   3   0 wz--n- 89.51g 64.00m
[root@svr7 ~]# lvs
  LV   VG   Attr       LSize  Pool Origin Data%  Meta%  Move Log Cpy%Syn
c Convert
  home rhel -wi-ao---- 37.45g

  root rhel -wi-ao---- 50.00g

  swap rhel -wi-ao----  2.00g

```

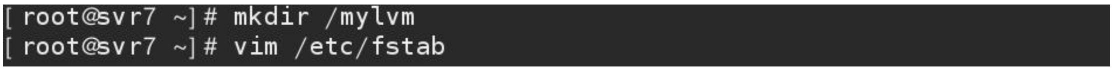


```
[root@svr7 ~]# lvcreate -L 16G -n mylv myvg
  Logical volume "mylv" created.
```

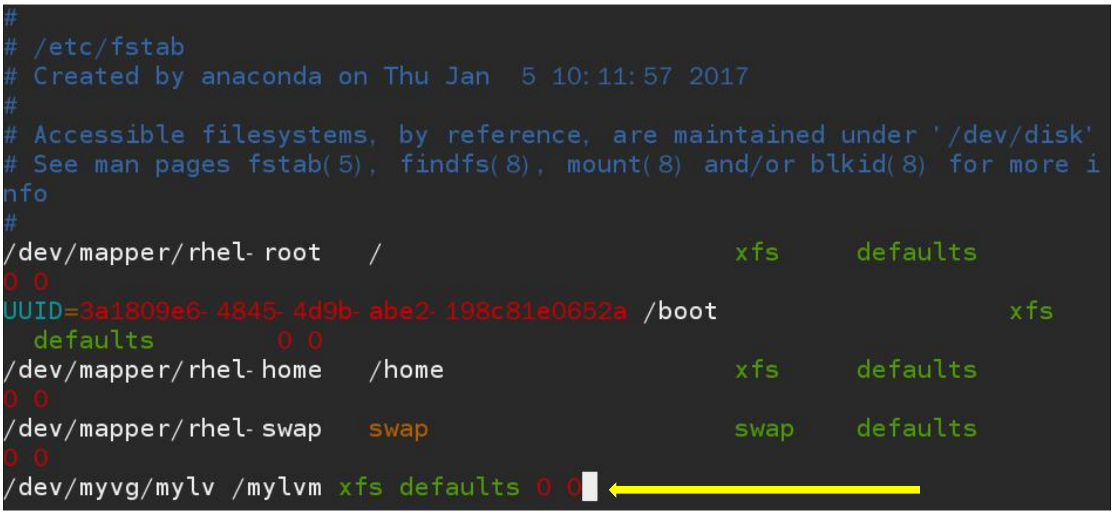


```
[root@svr7 ~]# mkfs.xfs /dev/myvg/mylv #格式化
meta-data=/dev/myvg/mylv         isize=256    agcount=4, agsize=1048576
blks
         =                       sectsz=512   attr=2, projid32bit=1
         =                       crc=0        finobt=0
data     =                       bsize=4096   blocks=4194304, imaxpct=25
         =                       sunit=0      swidth=0 blks
naming   =version 2              bsize=4096   ascii-ci=0 ftype=0
log      =internal log           bsize=4096   blocks=2560, version=2
         =                       sectsz=512   sunit=0 blks, lazy-count=1
realtime =none                   extsz=4096   blocks=0, rtextents=0
[root@svr7 ~]# blkid /dev/myvg/mylv
/dev/myvg/mylv: UUID="fe761cd3-60da-48fd-aa70-0774511e1bfc" TYPE="xfs"
```

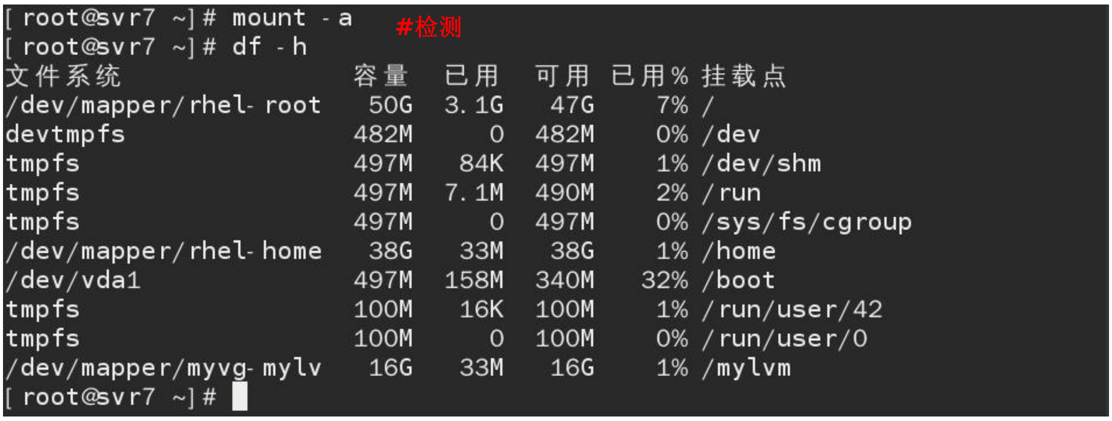
挂载使用 /etc/fstab



```
[root@svr7 ~]# mkdir /mylvm
[root@svr7 ~]# vim /etc/fstab
```

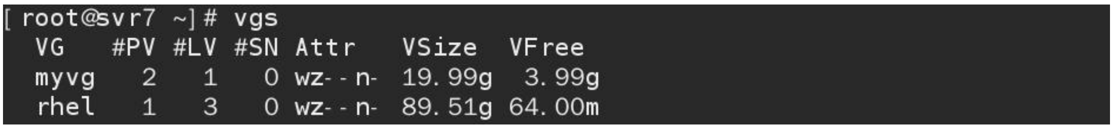


```
#
# /etc/fstab
# Created by anaconda on Thu Jan  5 10:11:57 2017
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more i
nfo
#
/dev/mapper/rhel-root   /                       xfs     defaults
0 0
UUID=3a1809e6-4845-4d9b-abe2-198c81e0652a /boot                   xfs
  defaults        0 0
/dev/mapper/rhel-home   /home                   xfs     defaults
0 0
/dev/mapper/rhel-swap   swap                    swap    defaults
0 0
/dev/myvg/mylv /mylvm xfs defaults 0 0
```

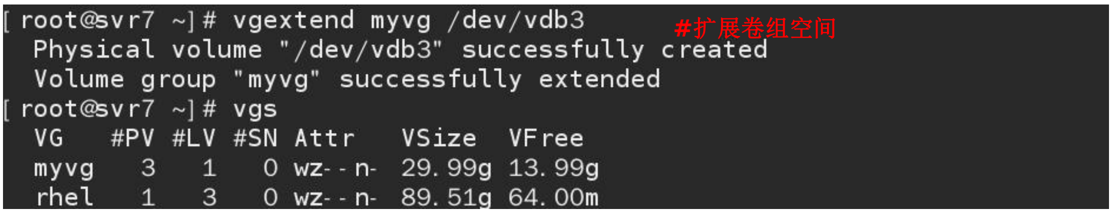


```
[root@svr7 ~]# mount -a    #检测
[root@svr7 ~]# df -h
文件系统                 容量  已用  可用 已用% 挂载点
/dev/mapper/rhel-root    50G  3.1G   47G    7% /
devtmpfs                482M     0  482M    0% /dev
tmpfs                   497M   84K  497M    1% /dev/shm
tmpfs                   497M  7.1M  490M    2% /run
tmpfs                   497M     0  497M    0% /sys/fs/cgroup
/dev/mapper/rhel-home    38G   33M   38G    1% /home
/dev/vda1               497M  158M  340M   32% /boot
tmpfs                   100M   16K  100M    1% /run/user/42
tmpfs                   100M     0  100M    0% /run/user/0
/dev/mapper/myvg-mylv    16G   33M   16G    1% /mylvm
[root@svr7 ~]# █
```

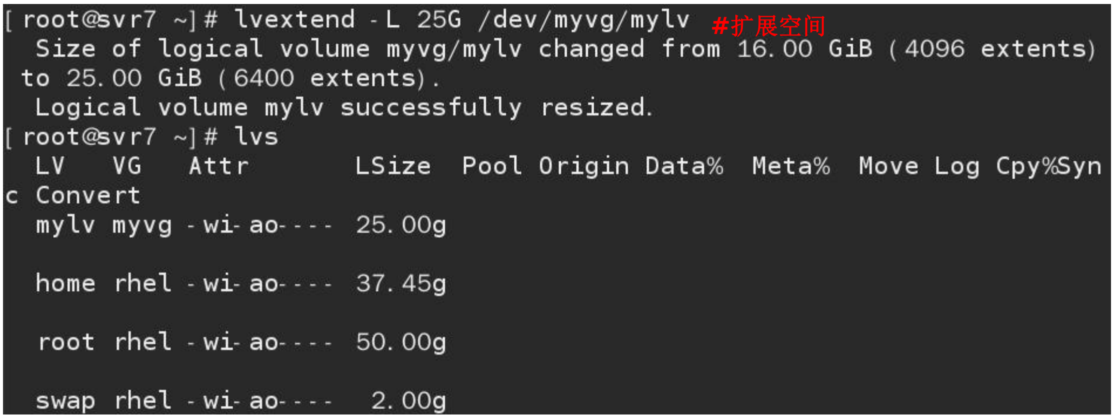
扩展逻辑卷、扩展空间、扩展文件系统



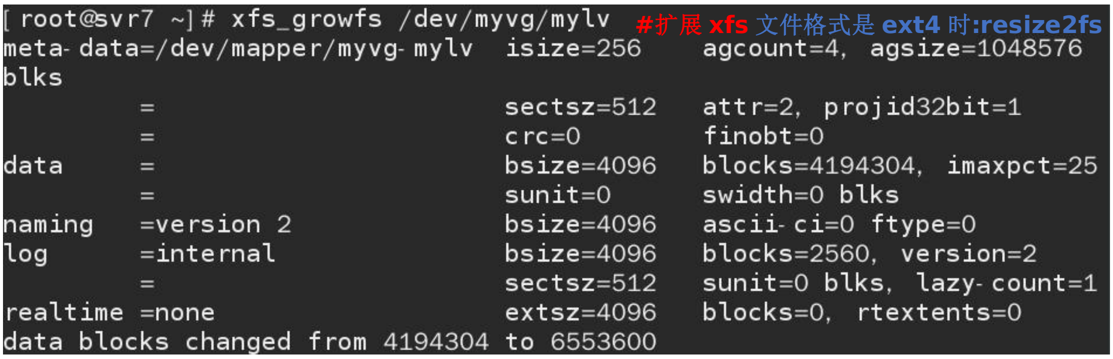
```
[root@svr7 ~]# vgs
  VG   #PV #LV #SN Attr   VSize  VFree
  myvg   2   1   0 wz--n- 19.99g  3.99g
  rhel   1   3   0 wz--n- 89.51g 64.00m
```



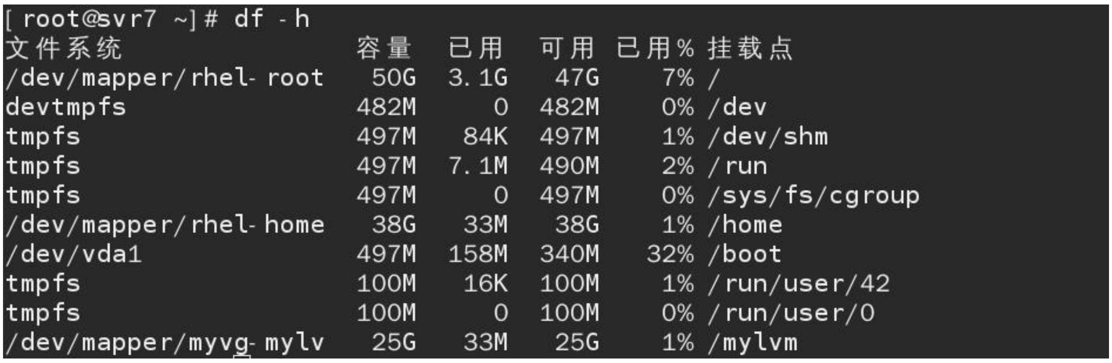
```
[root@svr7 ~]# vgextend myvg /dev/vdb3        #扩展卷组空间
  Physical volume "/dev/vdb3" successfully created
  Volume group "myvg" successfully extended
[root@svr7 ~]# vgs
  VG   #PV #LV #SN Attr   VSize  VFree
  myvg   3   1   0 wz--n- 29.99g 13.99g
  rhel   1   3   0 wz--n- 89.51g 64.00m
```



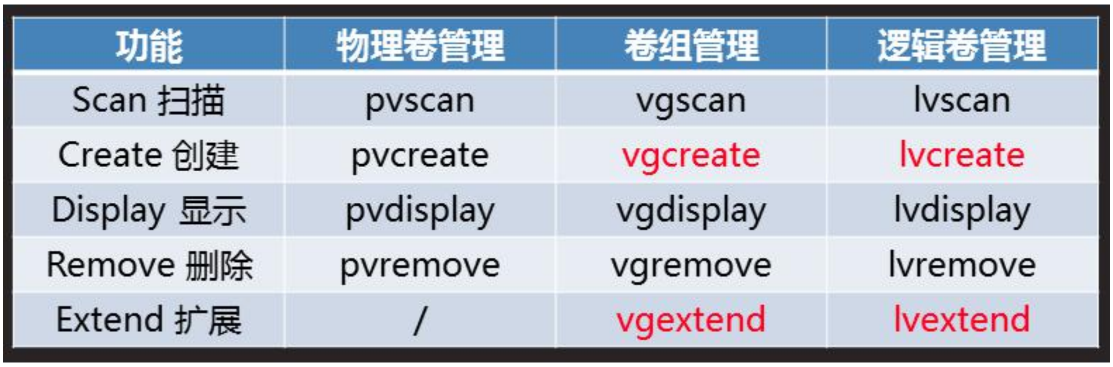
```
[root@svr7 ~]# lvextend -L 25G /dev/myvg/mylv  #扩展空间
  Size of logical volume myvg/mylv changed from 16.00 GiB (4096 extents)
 to 25.00 GiB (6400 extents).
  Logical volume mylv successfully resized.
[root@svr7 ~]# lvs
  LV   VG   Attr       LSize  Pool Origin Data%  Meta%  Move Log Cpy%Syn
c Convert
  mylv myvg -wi-ao---- 25.00g

  home rhel -wi-ao---- 37.45g

  root rhel -wi-ao---- 50.00g

  swap rhel -wi-ao----  2.00g
```



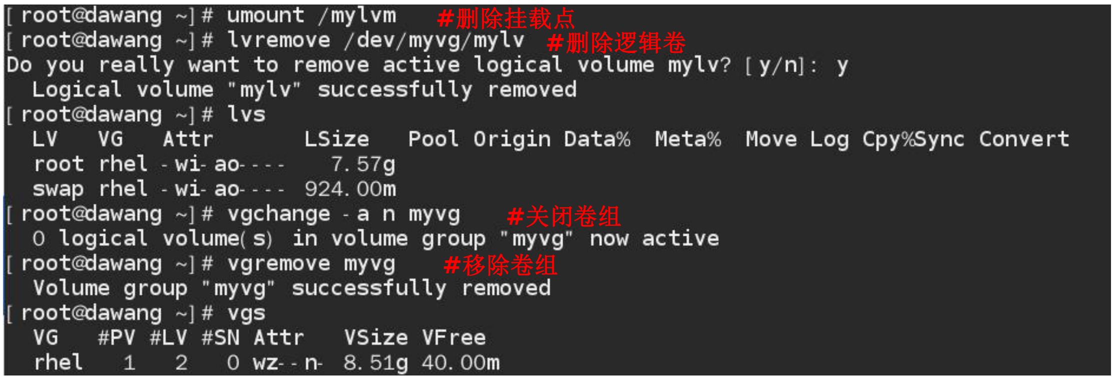
```
[root@svr7 ~]# xfs_growfs /dev/myvg/mylv  #扩展 xfs 文件格式是 ext4 时:resize2fs
meta-data=/dev/mapper/myvg-mylv  isize=256    agcount=4, agsize=1048576
blks
         =                       sectsz=512   attr=2, projid32bit=1
         =                       crc=0        finobt=0
data     =                       bsize=4096   blocks=4194304, imaxpct=25
         =                       sunit=0      swidth=0 blks
naming   =version 2              bsize=4096   ascii-ci=0 ftype=0
log      =internal               bsize=4096   blocks=2560, version=2
         =                       sectsz=512   sunit=0 blks, lazy-count=1
realtime =none                   extsz=4096   blocks=0, rtextents=0
data blocks changed from 4194304 to 6553600
```



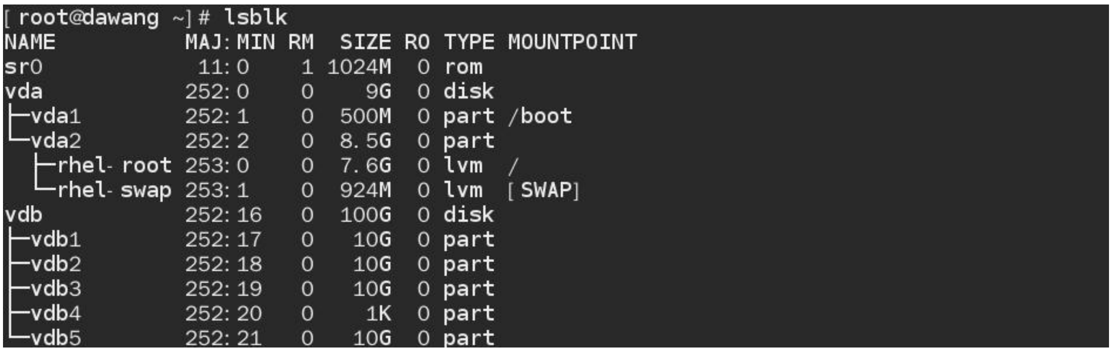
```
[root@svr7 ~]# df -h
文件系统                 容量   已用   可用  已用% 挂载点
/dev/mapper/rhel-root     50G   3.1G    47G    7% /
devtmpfs                 482M      0   482M    0% /dev
tmpfs                    497M    84K   497M    1% /dev/shm
tmpfs                    497M   7.1M   490M    2% /run
tmpfs                    497M      0   497M    0% /sys/fs/cgroup
/dev/mapper/rhel-home     38G    33M    38G    1% /home
/dev/vda1                497M   158M   340M   32% /boot
tmpfs                    100M    16K   100M    1% /run/user/42
tmpfs                    100M      0   100M    0% /run/user/0
/dev/mapper/myvg-mylv     25G    33M    25G    1% /mylvm
```



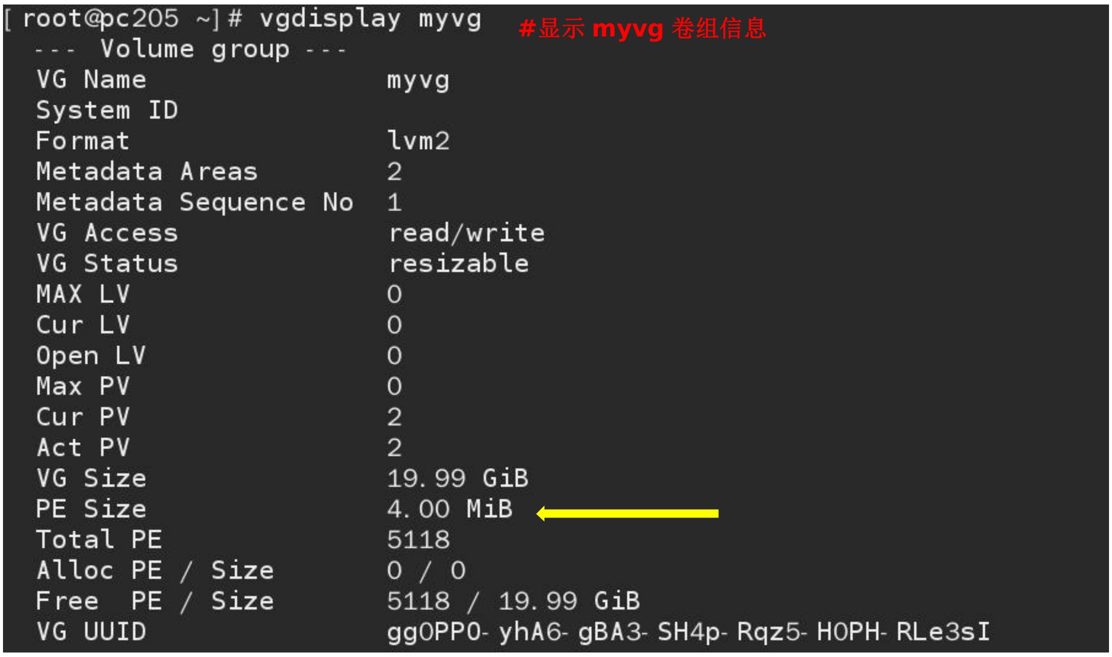
功能	物理卷管理	卷组管理	逻辑卷管理
Scan 扫描	pvscan	vgscan	lvscan
Create 创建	pvcreate	vgcreate	lvcreate
Display 显示	pvdisplay	vgdisplay	lvdisplay
Remove 删除	pvremove	vgremove	lvremove
Extend 扩展	/	vgextend	lvextend



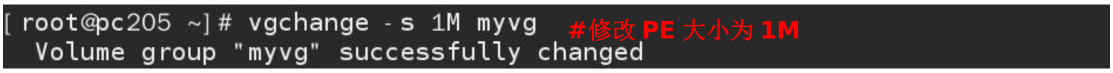
```
[root@dawang ~]# umount /mylvm     #删除挂载点
[root@dawang ~]# lvremove /dev/myvg/mylv   #删除逻辑卷
Do you really want to remove active logical volume mylv? [y/n]: y
  Logical volume "mylv" successfully removed
[root@dawang ~]# lvs
  LV   VG   Attr       LSize   Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert
  root rhel -wi-ao----   7.57g
  swap rhel -wi-ao---- 924.00m
[root@dawang ~]# vgchange -a n myvg    #关闭卷组
  0 logical volume(s) in volume group "myvg" now active
[root@dawang ~]# vgremove myvg     #移除卷组
  Volume group "myvg" successfully removed
[root@dawang ~]# vgs
  VG   #PV #LV #SN Attr   VSize VFree
  rhel   1   2   0 wz--n- 8.51g 40.00m
```



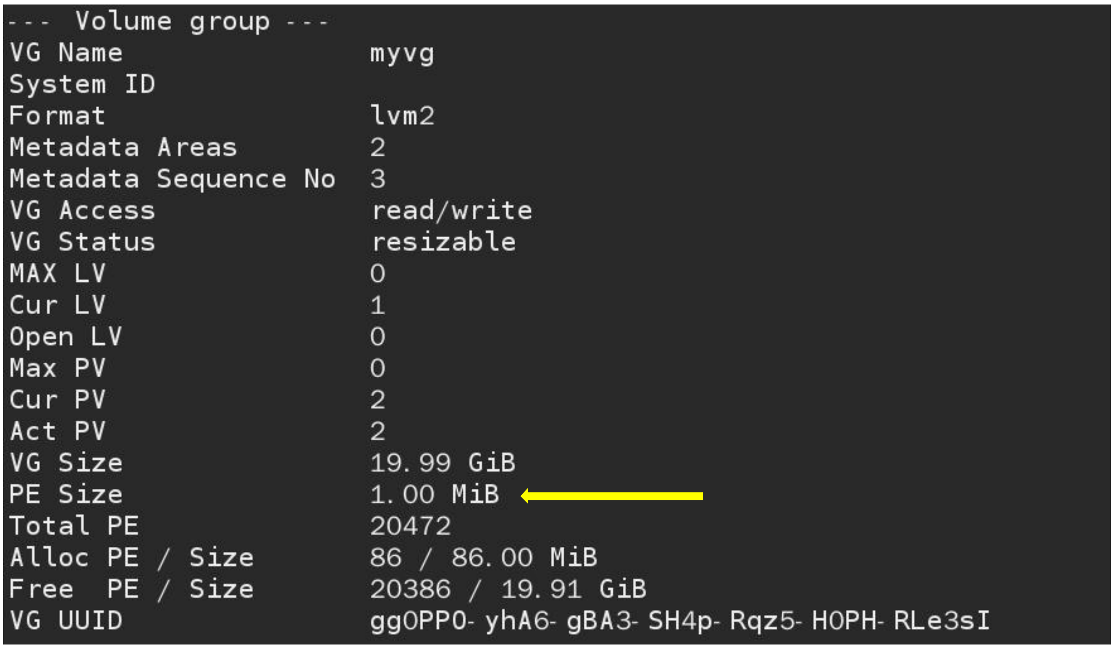
```
[root@dawang ~]# lsblk
NAME            MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sr0              11:0    1 1024M  0 rom
vda             252:0    0    9G  0 disk
├─vda1          252:1    0  500M  0 part /boot
└─vda2          252:2    0  8.5G  0 part
  ├─rhel-root 253:0    0  7.6G  0 lvm  /
  └─rhel-swap 253:1    0  924M  0 lvm  [SWAP]
vdb             252:16   0  100G  0 disk
├─vdb1          252:17   0   10G  0 part
├─vdb2          252:18   0   10G  0 part
├─vdb3          252:19   0   10G  0 part
├─vdb4          252:20   0    1K  0 part
└─vdb5          252:21   0   10G  0 part
```



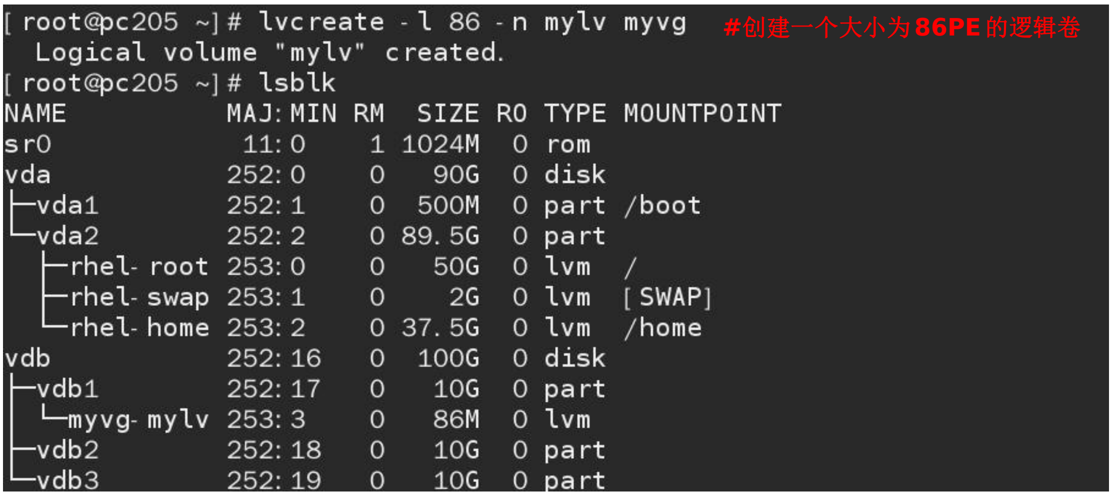
```
[root@pc205 ~]# vgdisplay myvg   #显示 myvg 卷组信息
  --- Volume group ---
  VG Name               myvg
  System ID
  Format                lvm2
  Metadata Areas        2
  Metadata Sequence No  1
  VG Access             read/write
  VG Status             resizable
  MAX LV                0
  Cur LV                0
  Open LV               0
  Max PV                0
  Cur PV                2
  Act PV                2
  VG Size               19.99 GiB
  PE Size               4.00 MiB
  Total PE              5118
  Alloc PE / Size       0 / 0
  Free  PE / Size       5118 / 19.99 GiB
  VG UUID               gg0PP0-yhA6-gBA3-SH4p-Rqz5-H0PH-RLe3sI
```



```
[root@pc205 ~]# vgchange -s 1M myvg   #修改 PE 大小为 1M
  Volume group "myvg" successfully changed
```

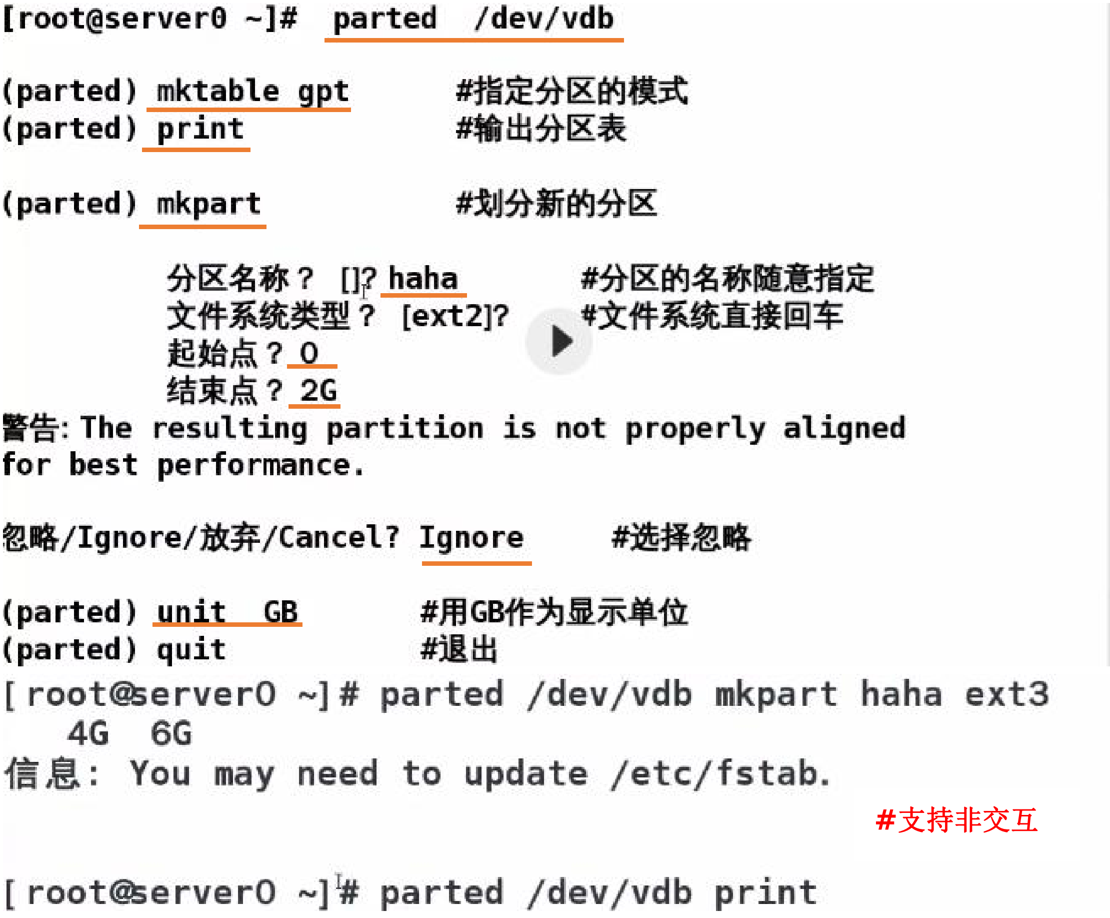


```
--- Volume group ---
VG Name               myvg
System ID
Format                lvm2
Metadata Areas        2
Metadata Sequence No  3
VG Access             read/write
VG Status             resizable
MAX LV                0
Cur LV                1
Open LV               0
Max PV                0
Cur PV                2
Act PV                2
VG Size               19.99 GiB
PE Size               1.00 MiB
Total PE              20472
Alloc PE / Size       86 / 86.00 MiB
Free  PE / Size       20386 / 19.91 GiB
VG UUID               gg0PP0-yhA6-gBA3-SH4p-Rqz5-H0PH-RLe3sI
```

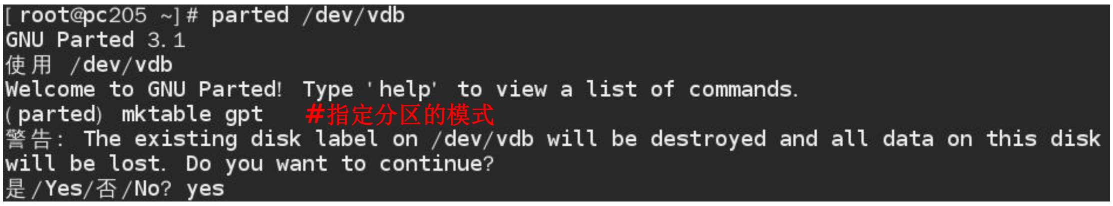


```
[root@pc205 ~]# lvcreate -l 86 -n mylv myvg   #创建一个大小为86PE的逻辑卷
  Logical volume "mylv" created.
[root@pc205 ~]# lsblk
NAME           MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT
sr0             11:0    1 1024M  0 rom
vda            252:0    0    90G  0 disk
├─vda1         252:1    0   500M  0 part /boot
└─vda2         252:2    0  89.5G  0 part
  ├─rhel-root  253:0    0    50G  0 lvm  /
  ├─rhel-swap  253:1    0     2G  0 lvm  [SWAP]
  └─rhel-home  253:2    0  37.5G  0 lvm  /home
vdb            252:16   0   100G  0 disk
├─vdb1         252:17   0    10G  0 part
│ └─myvg-mylv  253:3    0    86M  0 lvm
├─vdb2         252:18   0    10G  0 part
└─vdb3         252:19   0    10G  0 part
```

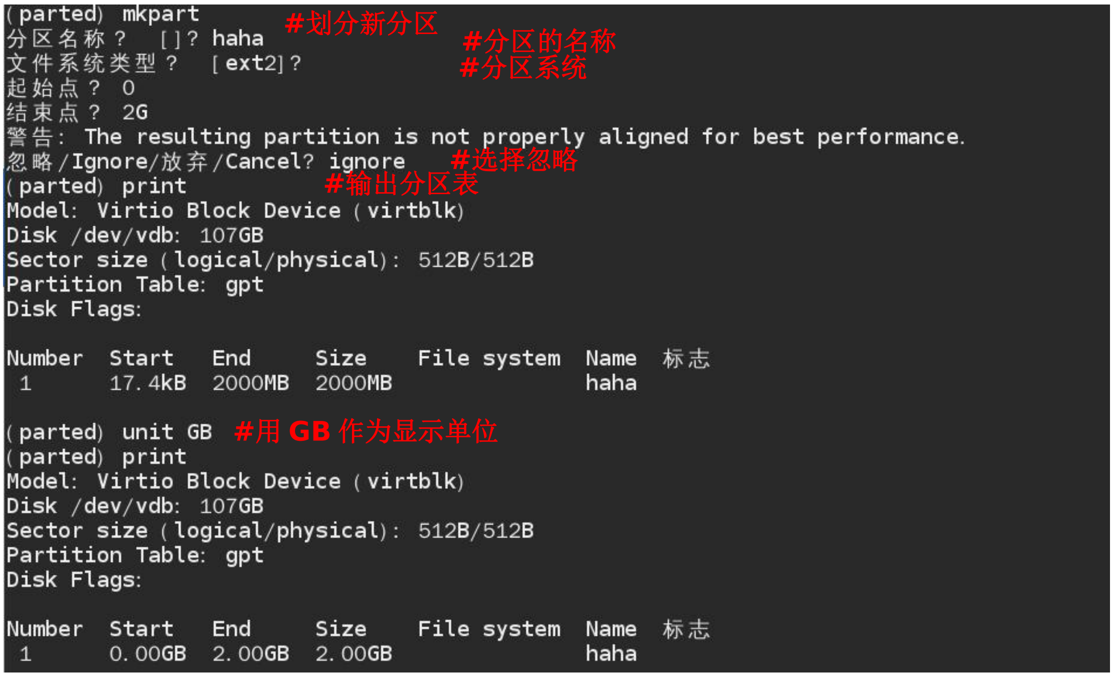
Parted 分区方法（MBR 或 GPT，针对 GPT）



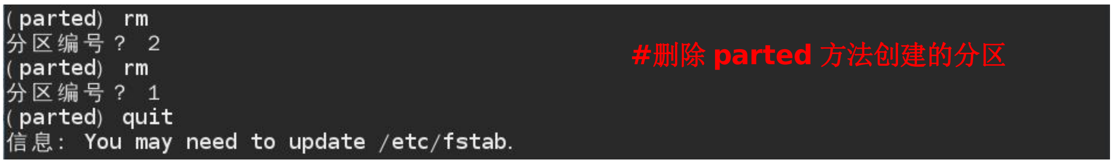
```
[root@server0 ~]#  parted  /dev/vdb

(parted) mktable gpt        #指定分区的模式
(parted) print              #输出分区表

(parted) mkpart             #划分新的分区

          分区名称？ []? haha        #分区的名称随意指定
          文件系统类型？ [ext2]?     #文件系统直接回车
          起始点？ 0
          结束点？ 2G
警告: The resulting partition is not properly aligned
for best performance.

忽略/Ignore/放弃/Cancel? Ignore      #选择忽略

(parted) unit  GB          #用GB作为显示单位
(parted) quit              #退出
[root@server0 ~]# parted /dev/vdb mkpart haha ext3
   4G  6G
信息: You may need to update /etc/fstab.
                                              #支持非交互

[root@server0 ~]# parted /dev/vdb print
```



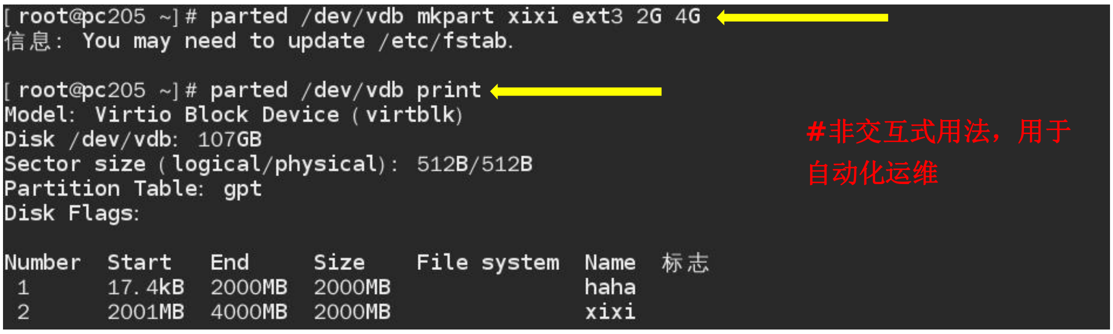
```
[root@pc205 ~]# parted /dev/vdb
GNU Parted 3.1
使用 /dev/vdb
Welcome to GNU Parted! Type 'help' to view a list of commands.
(parted) mktable gpt    #指定分区的模式
警告: The existing disk label on /dev/vdb will be destroyed and all data on this disk
will be lost. Do you want to continue?
是/Yes/否/No? yes
```



```
(parted) mkpart          #划分新分区
分区名称？  []? haha              #分区的名称
文件系统类型？  [ext2]?           #分区系统
起始点？ 0
结束点？ 2G
警告: The resulting partition is not properly aligned for best performance.
忽略/Ignore/放弃/Cancel? ignore    #选择忽略
(parted) print              #输出分区表
Model: Virtio Block Device (virtblk)
Disk /dev/vdb: 107GB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start   End     Size    File system  Name  标志
 1      17.4kB  2000MB  2000MB               haha

(parted) unit GB  #用 GB 作为显示单位
(parted) print
Model: Virtio Block Device (virtblk)
Disk /dev/vdb: 107GB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start   End     Size    File system  Name  标志
 1      0.00GB  2.00GB  2.00GB               haha
```



```
(parted) rm
分区编号？ 2                                #删除 parted 方法创建的分区
(parted) rm
分区编号？ 1
(parted) quit
信息: You may need to update /etc/fstab.
```



```
[root@pc205 ~]# parted /dev/vdb mkpart xixi ext3 2G 4G
信息: You may need to update /etc/fstab.

[root@pc205 ~]# parted /dev/vdb print
Model: Virtio Block Device (virtblk)
Disk /dev/vdb: 107GB                                   #非交互式用法，用于
Sector size (logical/physical): 512B/512B              自动化运维
Partition Table: gpt
Disk Flags:

Number  Start   End     Size    File system  Name  标志
 1      17.4kB  2000MB  2000MB               haha
 2      2001MB  4000MB  2000MB               xixi
```