Linux 系统下使用 LV 创建文件系统并使用

一【实验目标】

- 学习并掌握 Linux 系统下创建 PV

二【实验环境】

- 实验机环境：Centos 6.6
- 目标机环境： Centos 6.6
- 实验拓扑：如图 1 所示。

图 1 实验拓扑

三【实验原理】

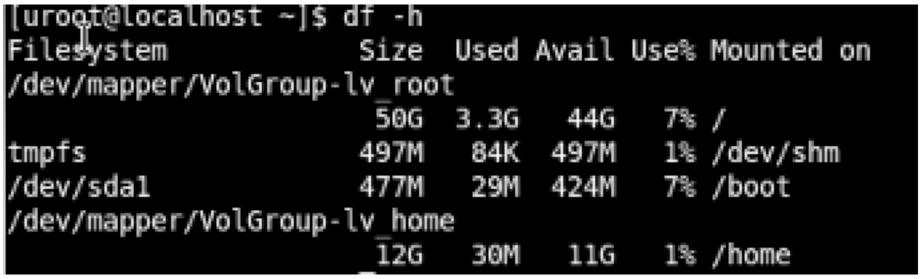
在 Linux 系统下，我们往往会遇到扩充磁盘的情况。普通情况下需要新加一块盘，重分区、格式化、数据复制、卸载就分区、挂载新分区等繁琐的步骤。其实，我们可以在安装系统时使用 LVM 来管理我们的文件系统，这样就可以弹性调整文件系统的容量。

四【实验步骤】

1、 新加磁盘启动系统后，查看现有磁盘使用情况

查看现有 lv_test 容量

命令：df –h



```
[uroot@localhost ~]$ df -h
Filesystem            Size  Used Avail Use% Mounted on
/dev/mapper/VolGroup-lv_root
                       50G  3.3G   44G   7% /
tmpfs                 497M   84K  497M   1% /dev/shm
/dev/sda1             477M   29M  424M   7% /boot
/dev/mapper/VolGroup-lv_home
                       12G   30M   11G   1% /home
```

图 2

2、 在磁盘 sdb 上创建新分区

命令：fdisk /dev/sdb

输入 p 打印现有分区情况(还没分区)

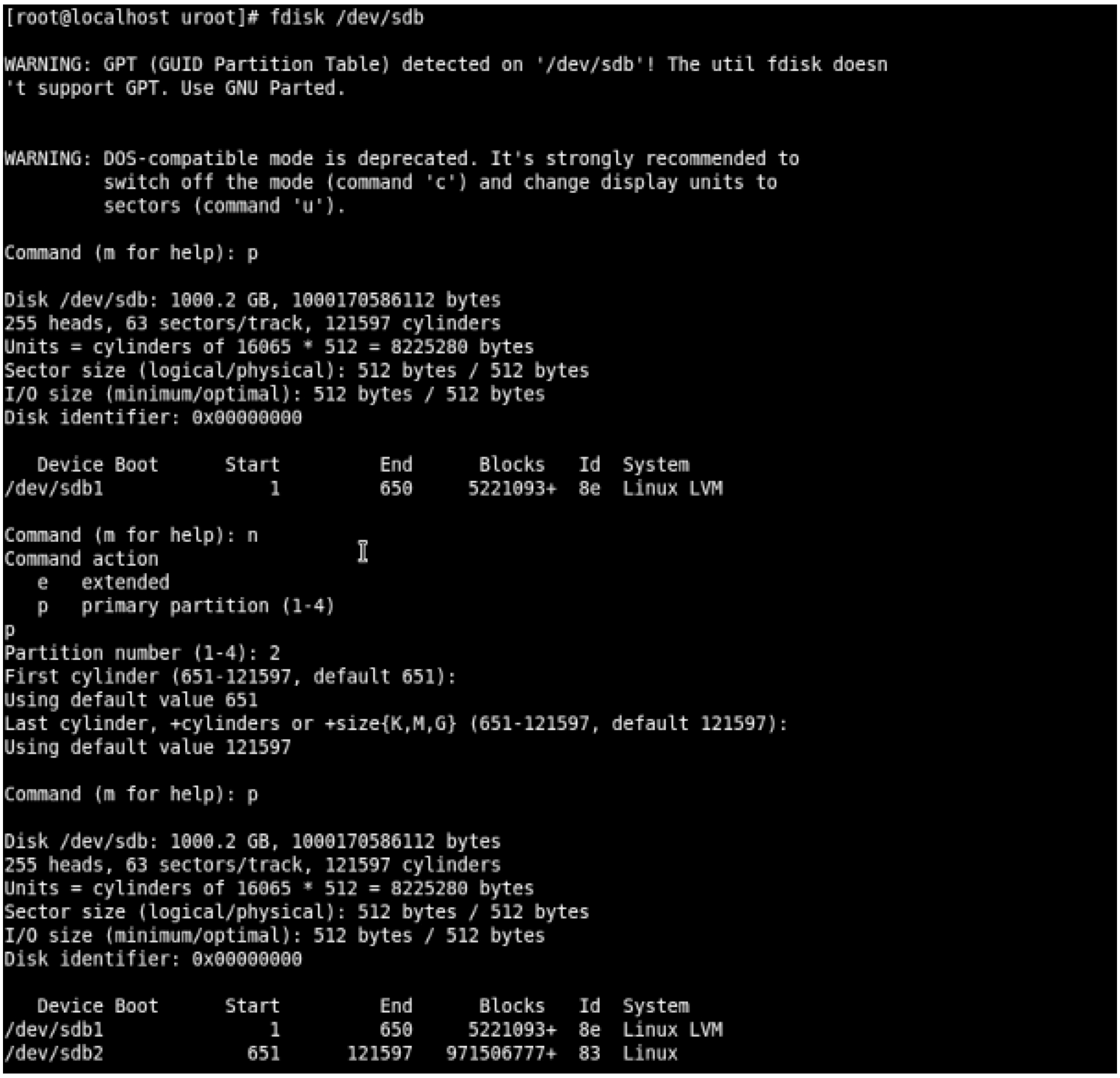
输入 n 新建分区

输入 p 建立主分区

输入 2 建立第二个主分区

分区起始位置和最后位置可以直接回车，采用默认值。

输入 p 打印分区情况，发现已建立一个分区/dev/sdb2，但是此分区为 linux 格式



```
[root@localhost uroot]# fdisk /dev/sdb

WARNING: GPT (GUID Partition Table) detected on '/dev/sdb'! The util fdisk doesn
't support GPT. Use GNU Parted.


WARNING: DOS-compatible mode is deprecated. It's strongly recommended to
         switch off the mode (command 'c') and change display units to
         sectors (command 'u').

Command (m for help): p

Disk /dev/sdb: 1000.2 GB, 1000170586112 bytes
255 heads, 63 sectors/track, 121597 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000

   Device Boot      Start         End      Blocks   Id  System
/dev/sdb1               1         650     5221093+  8e  Linux LVM

Command (m for help): n
Command action
   e   extended
   p   primary partition (1-4)
p
Partition number (1-4): 2
First cylinder (651-121597, default 651):
Using default value 651
Last cylinder, +cylinders or +size{K,M,G} (651-121597, default 121597):
Using default value 121597

Command (m for help): p

Disk /dev/sdb: 1000.2 GB, 1000170586112 bytes
255 heads, 63 sectors/track, 121597 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000

   Device Boot      Start         End      Blocks   Id  System
/dev/sdb1               1         650     5221093+  8e  Linux LVM
/dev/sdb2             651      121597   971506777+  83  Linux
```

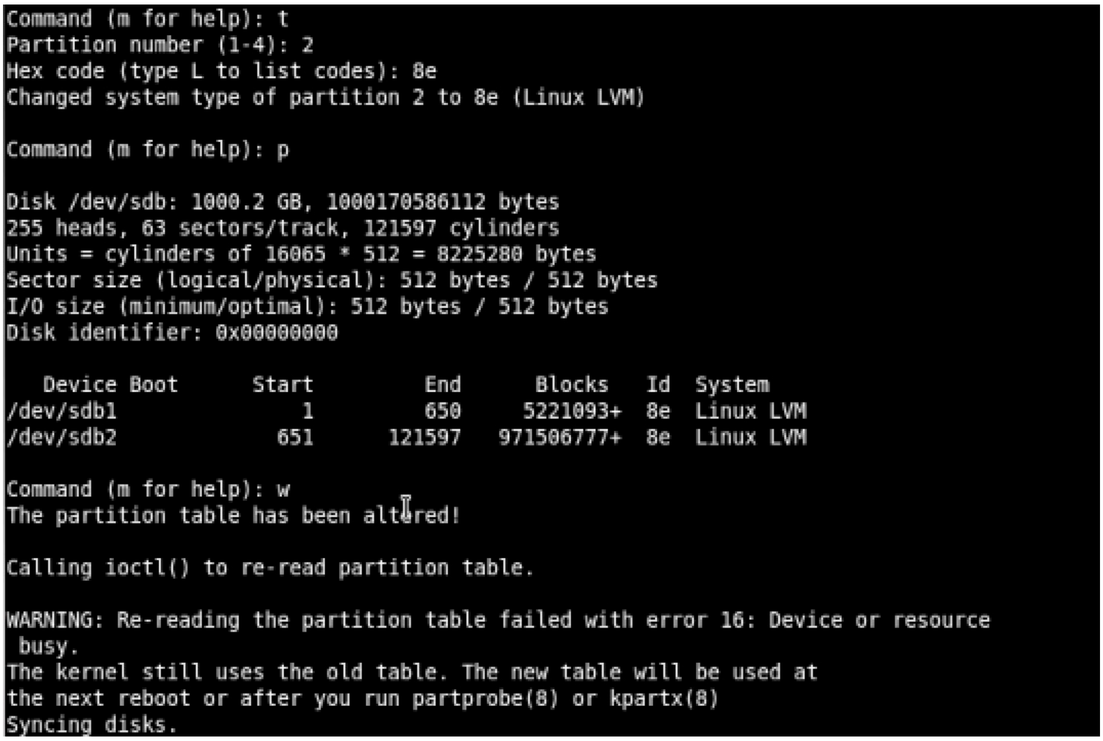
由于分区/dev/sdb2 为 Linux 格式，我们需要改变系统标识符为 Linux LVM 格式：

输入 t 改变分区的属性

输入 2 表示改变第二个分区的属性

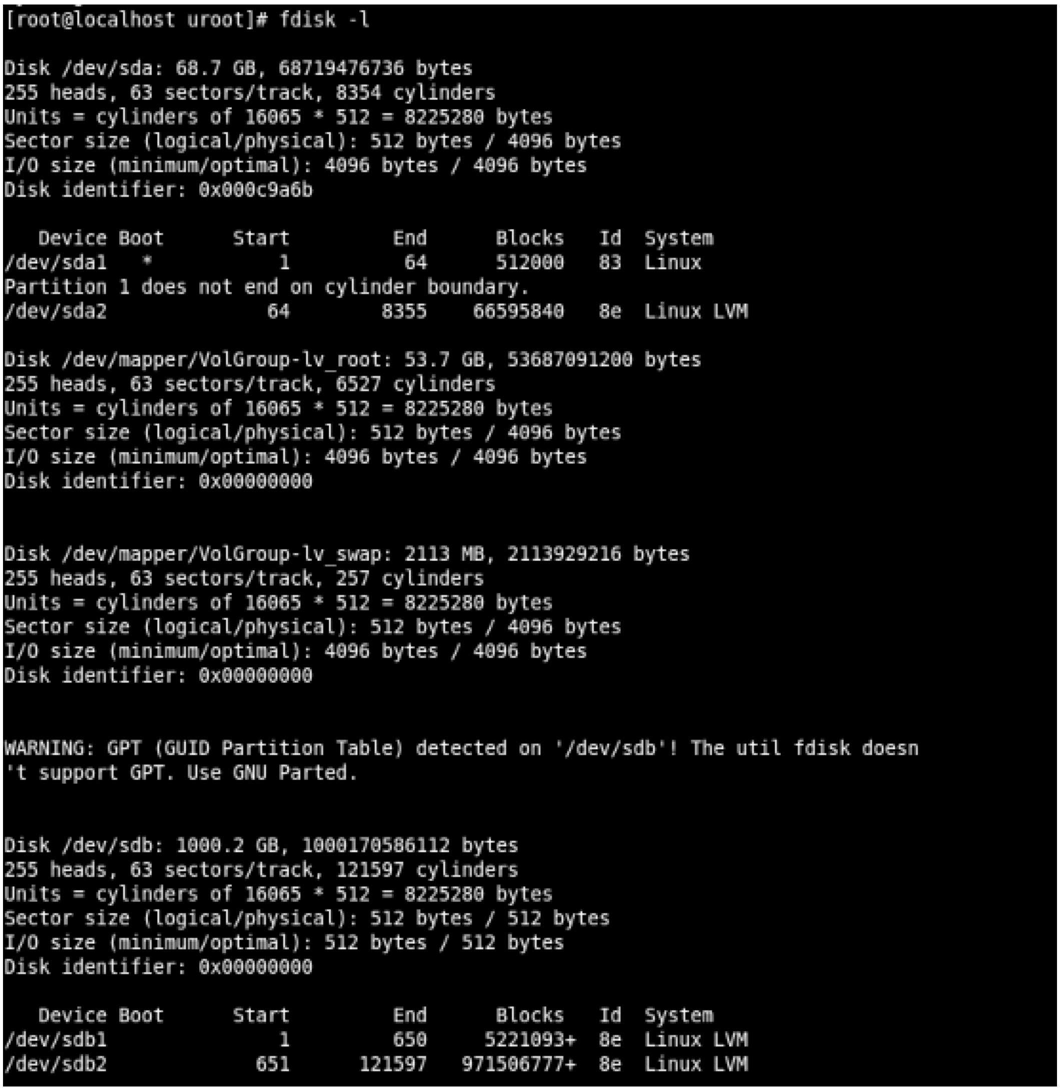
输入 8e 改变分区 2 为 Linux LVM 格式

输入 p 打印分区情况，发现建立的分区/dev/sdb1 为 Linux LVM 格式输入 w 保存分区



```
Command (m for help): t
Partition number (1-4): 2
Hex code (type L to list codes): 8e
Changed system type of partition 2 to 8e (Linux LVM)

Command (m for help): p

Disk /dev/sdb: 1000.2 GB, 1000170586112 bytes
255 heads, 63 sectors/track, 121597 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000

   Device Boot      Start         End      Blocks   Id  System
/dev/sdb1               1         650     5221093+  8e  Linux LVM
/dev/sdb2             651      121597   971506777+  8e  Linux LVM

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.

WARNING: Re-reading the partition table failed with error 16: Device or resource
 busy.
The kernel still uses the old table. The new table will be used at
the next reboot or after you run partprobe(8) or kpartx(8)
Syncing disks.
```

再次使用fdisk –l查看系统内存从盘情况发现/dev/sdb上已有一个Linux LVM格式的/dev/sdb2分区

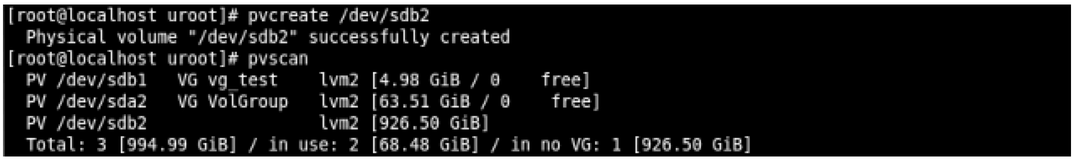


```
[root@localhost uroot]# fdisk -l

Disk /dev/sda: 68.7 GB, 68719476736 bytes
255 heads, 63 sectors/track, 8354 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 4096 bytes
Disk identifier: 0x000c9a6b

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1   *           1          64      512000   83  Linux
Partition 1 does not end on cylinder boundary.
/dev/sda2              64        8355    66595840   8e  Linux LVM

Disk /dev/mapper/VolGroup-lv_root: 53.7 GB, 53687091200 bytes
255 heads, 63 sectors/track, 6527 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 4096 bytes
Disk identifier: 0x00000000


Disk /dev/mapper/VolGroup-lv_swap: 2113 MB, 2113929216 bytes
255 heads, 63 sectors/track, 257 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 4096 bytes
Disk identifier: 0x00000000


WARNING: GPT (GUID Partition Table) detected on '/dev/sdb'! The util fdisk doesn
't support GPT. Use GNU Parted.


Disk /dev/sdb: 1000.2 GB, 1000170586112 bytes
255 heads, 63 sectors/track, 121597 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000

   Device Boot      Start         End      Blocks   Id  System
/dev/sdb1               1         650     5221093+  8e  Linux LVM
/dev/sdb2             651      121597   971506777+  8e  Linux LVM
```

3、 创建 PV：

命令：pvcreate /dev/sdb2

查看系统 pv：pvscan

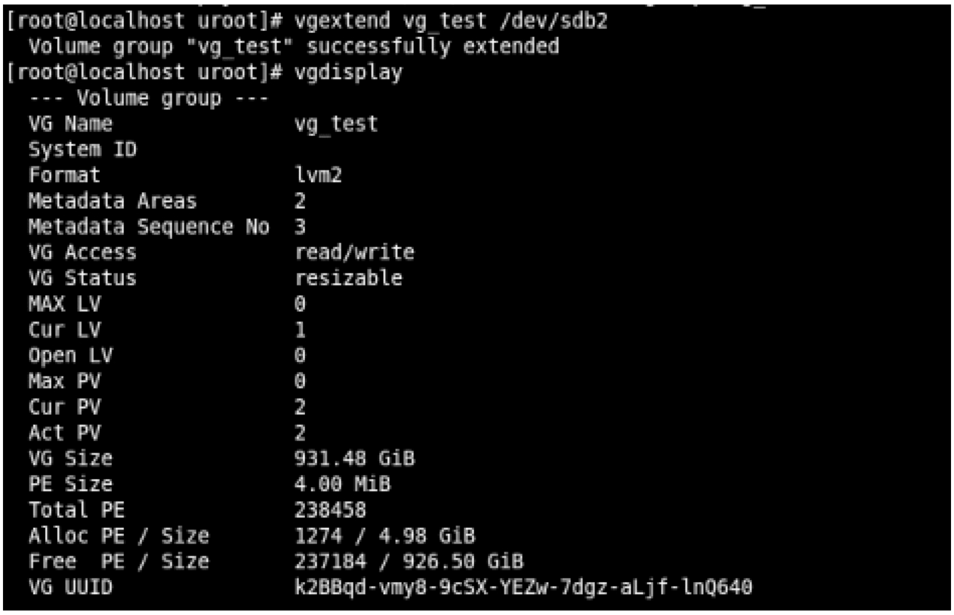


```
[root@localhost uroot]# pvcreate /dev/sdb2
  Physical volume "/dev/sdb2" successfully created
[root@localhost uroot]# pvscan
  PV /dev/sdb1   VG vg_test    lvm2 [4.98 GiB / 0    free]
  PV /dev/sda2   VG VolGroup   lvm2 [63.51 GiB / 0    free]
  PV /dev/sdb2                 lvm2 [926.50 GiB]
  Total: 3 [994.99 GiB] / in use: 2 [68.48 GiB] / in no VG: 1 [926.50 GiB]
```

4、 增加 VG 容量

命令：vgextend vg_test /dev/sdb2

查看：vgdisplay



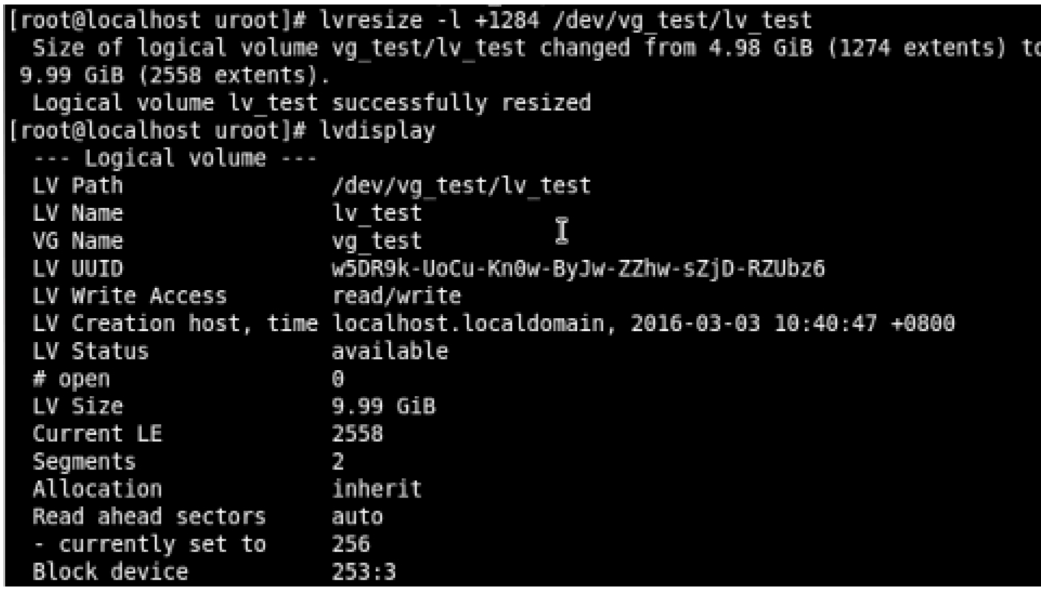
```
[root@localhost uroot]# vgextend vg_test /dev/sdb2
  Volume group "vg_test" successfully extended
[root@localhost uroot]# vgdisplay
  --- Volume group ---
  VG Name               vg_test
  System ID
  Format                lvm2
  Metadata Areas        2
  Metadata Sequence No  3
  VG Access             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               931.48 GiB
  PE Size               4.00 MiB
  Total PE              238458
  Alloc PE / Size       1274 / 4.98 GiB
  Free  PE / Size       237184 / 926.50 GiB
  VG UUID               k2BBqd-vmy8-9cSX-YEZw-7dgz-aLjf-lnQ640
```

图 9

5、 增加 LV 容量

命令：lvresize –l +1284 /dev/vg_test/lv_test

查看增加容量后的 LV



```
[root@localhost uroot]# lvresize -l +1284 /dev/vg_test/lv_test
  Size of logical volume vg_test/lv_test changed from 4.98 GiB (1274 extents) t
 9.99 GiB (2558 extents).
  Logical volume lv_test successfully resized
[root@localhost uroot]# lvdisplay
  --- Logical volume ---
  LV Path                /dev/vg_test/lv_test
  LV Name                lv_test
  VG Name                vg_test
  LV UUID                w5DR9k-UoCu-Kn0w-ByJw-ZZhw-sZjD-RZUbz6
  LV Write Access        read/write
  LV Creation host, time localhost.localdomain, 2016-03-03 10:40:47 +0800
  LV Status              available
  # open                 0
  LV Size                9.99 GiB
  Current LE             2558
  Segments               2
  Allocation             inherit
  Read ahead sectors     auto
  - currently set to     256
  Block device           253:3
```

6、 增加文件系统的容量

命令：resize2fs /dev/vg_test/lv_test

五【实验思考】

- 使用 fdisk 命令进行分区。
- 增加 VG 容量命令 vgextend。
- 查看 VG 容量命令 vgdisplay。