

Linux 系统下创建 VG 实验信息

一【实验目标】

- 学习并掌握 Linux 系统下创建 VG

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

(1)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)命令：fdisk -l

我们发现系统已经有一个 1T 的磁盘 sdb,这个磁盘共有 1305 个柱面,每个柱面大小是 121597,但是还没对其分区。

```
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: 0x21874022
```

图 3

2、对磁盘 sdb 进行分区

如果不知道 fdisk 里面的具体操作，可输入 m 进行帮助。最常用的是 n（新建）d（删除）p（打印）q（退出）t（修改系统标识符）w（写入并退出）。

命令：fdisk /dev/sdb

```
[root@localhost uroot]# fdisk /dev/sdb
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): m
Command action
 a toggle a bootable flag
 b edit bsd disklabel
 c toggle the dos compatibility flag
 d delete a partition
 l list known partition types
 m print this menu
 n add a new partition
 o create a new empty DOS partition table
 p print the partition table
 q quit without saving changes
 s create a new empty Sun disklabel
 t change a partition's system id
 u change display/entry units
 v verify the partition table
 w write table to disk and exit
 x extra functionality (experts only)
```

图 4

(1) 建立新的分区

输入 **p** 打印现有分区情况（还没有分区）

输入 **n** 新建分区

输入 **p** 为建立主分区（此时的 p 是在 n 后的，不是打印）

输入 **1** 为建立第一个主分区

分区起始位置可以直接回车，默认是 1

分区最后位置为 **650**（因为每个柱面约 8M，650 柱面约是 5G，本实验只 5G，剩余的做增加 LV 实验用）

输入 **p** 打印分区情况，发现已建立一个分区 **/dev/sdb1**，但是 此分区为 Linux 格式

```
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
Command (m for help): n
Command action
  e   extended
  p   primary partition (1-4)
p
Partition number (1-4): 1
First cylinder (1-121597, default 1):
Using default value 1
Last cylinder, +cylinders or +size{K,M,G} (1-121597, default 121597): 650

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+   83   Linux
```

图 5

```

Command (m for help): t
Selected partition 1
Hex code (type L to list codes): L

 0 Empty                24 NEC DOS              81 Minix / old Lin bf Solaris
 1 FAT12                 39 Plan 9               82 Linux swap / So c1 DRDOS/sec (FAT-
 2 XENIX root            3c PartitionMagic       83 Linux                c4 DRDOS/sec (FAT-
 3 XENIX usr             40 Venix 80286           84 OS/2 hidden C:  c6 DRDOS/sec (FAT-
 4 FAT16 <32M           41 PPC PREP Boot        85 Linux extended     c7 Syrix
 5 Extended              42 SFS                  86 NTFS volume set    da Non-FS data
 6 FAT16                 4d QNX4.x              87 NTFS volume set    db CP/M / CTOS / .
 7 HPFS/NTFS             4e QNX4.x 2nd part     88 Linux plaintext    de Dell Utility
 8 AIX                   4f QNX4.x 3rd part     8e Linux LVM          df BootIt
 9 AIX bootable          50 OnTrack DM          93 Amoeba             e1 DOS access
 a OS/2 Boot Manag     51 OnTrack DM6 Aux    94 Amoeba BBT         e3 DOS R/O
 b W95 FAT32            52 CP/M                9f BSD/OS             e4 SpeedStor
 c W95 FAT32 (LBA)     53 OnTrack DM6 Aux   a0 IBM Thinkpad hi    eb BeOS fs
 e W95 FAT16 (LBA)     54 OnTrackDM6         a5 FreeBSD           ee GPT
 f W95 Ext'd (LBA)     55 EZ-Drive           a6 OpenBSD           ef EFI (FAT-12/16/
10 OPUS                 56 Golden Bow         a7 NeXTSTEP          f0 Linux/PA-RISC b
11 Hidden FAT12         5c Priam Edisk        a8 Darwin UFS        f1 SpeedStor
12 Compaq diagnost     61 SpeedStor          a9 NetBSD            f4 SpeedStor
14 Hidden FAT16 <3     63 GNU HURD or Sys    ab Darwin boot       f2 DOS secondary
16 Hidden FAT16         64 Novell Netware     af HFS / HFS+        fb VMware VMFS
17 Hidden HPFS/NTF     65 Novell Netware     b7 BSDI fs           fc VMware VMKCORE
18 AST SmartSleep      70 DiskSecure Mult   b8 BSDI swap         fd Linux raid auto
1b Hidden W95 FAT3     75 PC/IX              bb Boot Wizard hid   fe LANstep
1c Hidden W95 FAT3     80 Old Minix          be Solaris boot      ff BBT
1e Hidden W95 FAT1

Hex code (type L to list codes): 8e
Changed system type of partition 1 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

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

Calling ioctl() to re-read partition table.
Syncing disks.

```

图 6

(2)改变系统标识符:

输入 t 改变分区 1 的属性

输入 L 查看有个属性对应的命令

输入 8e 改变分区 1 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

tip:再次使用 **fdisk -l** 查看系统内磁盘情况发现 /dev/sdb 上已有一个 Linux LVM 格式的 /dev/sdb1 分区

```

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

```

图 7

(3)使 kernel 重新读取分区表

命令: **partprobe**

对于 /dev/sda 的警告不予理会

```

[root@centos6 ~]# partprobe
Warning: WARNING: the kernel failed to re-read the partition table on /dev/sda (
Device or resource busy). As a result, it may not reflect all of your changes u
ntil after reboot.
SEAGLE

```

图 8

3、创建 PV:

扫描系统 PV: **pvscan**

创建 PV: **pvcreate /dev/sdb1**

查看 PV: **pvdisplay**

这样我们就创建了一个 4.98G 的 PV, 注意 Allocatable 为 NO

```

[root@localhost Desktop]# pvscan
PV /dev/sda2   VG VolGroup   lvm2 [63.51 GiB / 0   free]
Total: 1 [63.51 GiB] / in use: 1 [63.51 GiB] / in no VG: 0 [0   ]
[root@localhost Desktop]# pvcreate
Please enter a physical volume path
Run 'pvcreate --help' for more information.
[root@localhost Desktop]# pvcreate /dev/sdb1
Physical volume "/dev/sdb1" successfully created
[root@localhost Desktop]# pvscan
PV /dev/sda2   VG VolGroup   lvm2 [63.51 GiB / 0   free]
PV /dev/sdb1   VG VolGroup   lvm2 [4.98 GiB]
Total: 2 [68.49 GiB] / in use: 1 [63.51 GiB] / in no VG: 1 [4.98 GiB]
[root@localhost Desktop]# pvdisplay
--- Physical volume ---
PV Name               /dev/sda2
VG Name               VolGroup
PV Size               63.51 GiB / not usable 3.00 MiB
Allocatable           yes (but full)
PE Size               4.00 MiB
Total PE              16258
Free PE               0
Allocated PE          16258
PV UUID               4bR5c3-h4YE-cPlI-Djep-zJnQ-86SD-zRADRy

"/dev/sdb1" is a new physical volume of "4.98 GiB"
--- NEW Physical volume ---
PV Name               /dev/sdb1
VG Name
PV Size               4.98 GiB
Allocatable           NO
PE Size               0
Total PE              0
Free PE               0
Allocated PE          0
PV UUID               6UaEvL-8CTs-JFRB-9Rix-EGiH-77mq-dLKZA0

```

图 9

4、创建 VG:

扫描系统 VG: **vgscan**

创建 VG: **vgcreate vg_test /dev/sdb1**

查看 VG: **vgdisplay**

这样我们就创建了一个 4.98G (1274 个 PE, 要记住这个数字) 的 VG (名字为 **vg_test**)

```

[root@localhost Desktop]# vgscan
  Reading all physical volumes.  This may take a while...
  Found volume group "VolGroup" using metadata type lvm2
[root@localhost Desktop]# vgcreate vg_test /dev/sdb1
bash: vgcreate: command not found
[root@localhost Desktop]# vgcreate vg_test /dev/sdb1
  Volume group "vg_test" successfully created
[root@localhost Desktop]# vgscan
  Reading all physical volumes.  This may take a while...
  Found volume group "vg_test" using metadata type lvm2
  Found volume group "VolGroup" using metadata type lvm2
[root@localhost Desktop]# vgsdisplay
--- Volume group ---
VG Name                vg_test
System ID
Format                 lvm2
Metadata Areas         1
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                1
Act PV                 1
VG Size                4.98 GiB
PE Size                4.00 MiB
Total PE               1274
Alloc PE / Size        0 / 0
Free PE / Size         1274 / 4.98 GiB
VG UUID                ZK63sY-5Kf9-xYwd-CXJT-ZXL0-Jpxs-RBRt4E

--- Volume group ---
VG Name                VolGroup
System ID
Format                 lvm2
Metadata Areas         1
Metadata Sequence No   4
VG Access              read/write
VG Status              resizable
MAX LV                 0
Cur LV                3
Open LV                3
Max PV                 0
Cur PV                1
Act PV                 1
VG Size                63.51 GiB
PE Size                4.00 MiB
Total PE               16258
Alloc PE / Size        16258 / 63.51 GiB
Free PE / Size         0 / 0
VG UUID                E2Z31F-0IzU-JWIh-D33o-fcU8-E7xd-tq1l3X

```

图 10

五【实验思考】

- 使用 fdisk 命令进行分区。
- partprobe, kernel 重新读取分区表。