Linux 系统下 raid0 的创建

一【实验目标】

- 学习并掌握 Linux 系统下创建 raid0

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】

RAID 0 是最早出现的 RAID 模式，即 Data Stripping 数据分条技术。RAID 0 是组建磁盘阵列中最简单的一种形式，只需要 2 块以上的硬盘即可，成本低，可以提高整个磁盘的性能和吞吐量。RAID 0 没有提供冗余或错误修复能力，但实现成本是最低的。一般用于对数据安全性要求不高的情况。

四【实验步骤】

1、增加两块实验用磁盘 sdf 和 sdg，创建分区（以一块磁盘为例）

(1) 命令：fdisk /dev/sdf

n

p

1

1

128

w(保存)

```
[root@localhost yangbin]# fdisk /dev/sdf
Device contains neither a valid DOS partition table, nor Sun, SGI or OSF disklab
el
Building a new DOS disklabel with disk identifier 0x581ee2ef.
Changes will remain in memory only, until you decide to write them.
After that, of course, the previous content won't be recoverable.

Warning: invalid flag 0x0000 of partition table 4 will be corrected by w(rite)

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): n
Command action
   e   extended
   p   primary partition (1-4)
1
Invalid partition number for type `1'
Command action
   e   extended
   p   primary partition (1-4)
p
Partition number (1-4): 1
```

图 1

```
Partition number (1-4): 1
First cylinder (1-205, default 1): 1
Last cylinder, +cylinders or +size{K,M,G} (1-205, default 205): 128

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

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

图 2

(2) 将类型改为 Linux raid autodetect

命令：t

fd

```
Command (m for help): t
Selected partition 1
Hex code (type L to list codes): fd
Changed system type of partition 1 to fd (Linux raid autodetect)

Command (m for help): p

Disk /dev/sdg: 214 MB, 214958080 bytes
64 heads, 32 sectors/track, 205 cylinders
Units = cylinders of 2048 * 512 = 1048576 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x40b16f62

   Device Boot      Start         End      Blocks   Id  System
/dev/sdg1               1         128      131056   fd  Linux raid autodetect


[root@localhost yangbin]# fdisk -l

Disk /dev/sda: 21.5 GB, 21474836480 bytes
255 heads, 63 sectors/track, 2610 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: 0x0007475b

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1   *           1        1275    10240000   83  Linux
/dev/sda2            1275        1537     2097152   82  Linux swap / Solaris
[root@localhost yangbin]#
```

图 3

2、安装 mdamd（mdadm 是 mutiple devices admin 的简称，是 Linux 下一款标准的软件 RAID 管理工具

命令：yum install mdadm

```
[root@localhost yangbin]# yum install mdadm
Loaded plugins: fastestmirror, refresh-packagekit, security
Setting up Install Process
```

图 3

3、开始创建 raid0

（1） 命令：mdadm –C /dev/md0 –ayes –l0 –n2 /dev/sd[f,g]1

-C:--create 创建阵列

-a:--auto 同意创建设备

-l：--level 阵列模式，这里是 raid0

-n：--raid-devices 陈列中活动的磁盘数目，该数目加上备用磁盘数目等于总数目

/dev/md0:阵列设备名称

/dev/sd[f,g]1 参与创建阵列的磁盘名称

```
[root@localhost yangbin]# mdadm -C /dev/md0 -ayes -l0 -n2 /dev/sd[f,g]1
mdadm: /dev/sdf1 appears to be part of a raid array:
       level=raid0 devices=0 ctime=Wed Dec 31 19:00:00 1969
mdadm: partition table exists on /dev/sdf1 but will be lost or
       meaningless after creating array
Continue creating array?
Continue creating array? (y/n) y
mdadm: Defaulting to version 1.2 metadata
mdadm: array /dev/md0 started.
```

图 4

（2） 查看 raid 状态

命令：cat /proc/mdstat

mdadm –D /dev/md0

```
        Version : 1.2
  Creation Time : Thu May 12 11:27:33 2016
     Raid Level : raid0
     Array Size : 259072 (253.04 MiB 265.29 MB)
   Raid Devices : 2
  Total Devices : 2
    Persistence : Superblock is persistent

    Update Time : Thu May 12 11:27:33 2016
          State : clean
 Active Devices : 2
Working Devices : 2
 Failed Devices : 0
  Spare Devices : 0

     Chunk Size : 512K

           Name : localhost.localdomain:0  (local to host localhost.localdomain)
           UUID : 7bafb915:5d878391:14f0c9f4:07095982
         Events : 0

    Number   Major   Minor   RaidDevice State
       0       8       81        0      active sync   /dev/sdf1
       1       8       97        1      active sync   /dev/sdg1
```

Raid Level : 阵列级别；

Array Size : 阵列容量大小；

Raid Devices : RAID 成员的个数；

Total Devices : RAID 中下属成员的总计个数，因为还有冗余硬盘或分区，也就是 spare，为了 RAID 的正常运珩，随时可以推上去加入 RAID 的；

State : clean, degraded, recovering 状态，包括三个状态，clean 表示正常，degraded 表示有问题，recovering 表示正在恢复或构建；

Active Devices : 被激活的 RAID 成员个数；

Working Devices : 正常的工作的 RAID 成员个数；

Failed Devices : 出问题的 RAID 成员；

Spare Devices : 备用 RAID 成员个数，当一个 RAID 的成员出问题时，用其它硬盘或分区来顶替时，RAID 要进行构建，在没构建完成时，这个成员也会被认为是 spare 设备；

UUID : RAID 的 UUID 值，在系统中是唯一的；

（3）创建 RAID 配置文件

命令：echo DEVICE /dev/sd{f,g}1 >> /etc/mdadm.conf

madam –Ds >> /etc/mdadm.conf

```
[root@localhost yangbin]# echo DEVICE /dev/sd{f,g}1>>/etc/mdadm.conf
[root@localhost yangbin]# mdadm -Ds >> /etc/mdadm.conf
[root@localhost yangbin]# cat /etc/mdadm.conf
DEVICE /dev/sdf1 /dev/sdg1
ARRAY /dev/md0 metadata=1.2 name=localhost.localdomain:0 UUID=7bafb915:5d878391:
14f0c9f4:07095982
```

图 5

（3） 修改配置文件

之前生成的配置文件并不符合规范格式，我们需要将它改成规范格式

命令：vi /etc/mdadm.conf

```
DEVICE /dev/sdf1 /dev/sdg1
ARRAY /dev/md0 level=raid0 num-devices=2 UUID=7bafb915:5d878391:14f0c9f4:0709598
2
~
```

图 6

4、格式化并挂载磁盘阵列

命令：mkfs.ext4 /dev/md0

mkdir /raid0

mount /dev/md0/raid0

```
[root@localhost yangbin]# vi /etc/mdadm.conf
[root@localhost yangbin]# mkfs.ext4 /dev/md0
mke2fs 1.41.12 (17-May-2010)
Filesystem label=
OS type: Linux
Block size=1024 (log=0)
Fragment size=1024 (log=0)
Stride=512 blocks, Stripe width=1024 blocks
64768 inodes, 259072 blocks
12953 blocks (5.00%) reserved for the super user
First data block=1
Maximum filesystem blocks=67371008
32 block groups
8192 blocks per group, 8192 fragments per group
2024 inodes per group
Superblock backups stored on blocks:
        8193, 24577, 40961, 57345, 73729, 204801, 221185

Writing inode tables: done
Creating journal (4096 blocks): done
Writing superblocks and filesystem accounting information: done

This filesystem will be automatically checked every 26 mounts or
180 days, whichever comes first.  Use tune2fs -c or -i to override.
```

图 7

```
[root@localhost yangbin]# mkdir /raid0
[root@localhost yangbin]# mount /dev/md0 /raid0/
```

图 8

5、设置开机自启动

将挂载信息写入/etc/fstab

命令：vi /etc/fstab

```
#
# /etc/fstab
# Created by anaconda on Thu Apr 21 15:50:15 2016
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
UUID=6d8d8cf6-9df8-431a-af28-0c31bde15f1e /                       ext4    defaul
ts        1 1
UUID=4e845cc2-e230-44c6-bc43-3b02b37ed341 swap                    swap    defaul
ts        0 0
tmpfs                   /dev/shm                tmpfs   defaults        0 0
devpts                  /dev/pts                devpts  gid=5,mode=620  0 0
sysfs                   /sys                    sysfs   defaults        0 0
proc                    /proc                   proc    defaults        0 0
/dev/md0                /raid0                  ext4    defaults        0 0
~
~
~
~
~
~
"/etc/fstab" 15L, 787C
```