Redhat 6.3 下多路径管理的安装及配置

说明：以下测试为在虚拟机环境下用 Openfiler 充当 iscsi 储存，并将二个盘分配给安装有 Redhat 6.3 的虚拟机，每个盘有三条路径。然后开始安装并配置多路径管理。

1．用 fdisk –l 可查看到第一个盘三条路径对应盘 sdb,sbc,sdd

```
Disk /dev/sdb: 2785 MB, 2785017856 bytes
255 heads, 63 sectors/track, 338 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: 0x80c5b55b

   Device Boot      Start         End      Blocks   Id  System
/dev/sdb1               1         339     2716672    7  HPFS/NTFS
Partition 1 has different physical/logical endings:
     phys=(337, 254, 63) logical=(338, 55, 37)

Disk /dev/sdc: 2785 MB, 2785017856 bytes
255 heads, 63 sectors/track, 338 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: 0x80c5b55b

   Device Boot      Start         End      Blocks   Id  System
/dev/sdc1               1         339     2716672    7  HPFS/NTFS
Partition 1 has different physical/logical endings:
     phys=(337, 254, 63) logical=(338, 55, 37)

Disk /dev/sdd: 2785 MB, 2785017856 bytes
255 heads, 63 sectors/track, 338 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: 0x80c5b55b
```

2．第二个盘三条路径对应盘 sde,sbf,sdg

```
Disk /dev/sde: 1543 MB, 1543503872 bytes
48 heads, 62 sectors/track, 1012 cylinders
Units = cylinders of 2976 * 512 = 1523712 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000


Disk /dev/sdg: 1543 MB, 1543503872 bytes
48 heads, 62 sectors/track, 1012 cylinders
Units = cylinders of 2976 * 512 = 1523712 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000


Disk /dev/sdf: 1543 MB, 1543503872 bytes
48 heads, 62 sectors/track, 1012 cylinders
Units = cylinders of 2976 * 512 = 1523712 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000
```

3．多路径管理软件默认没有安装,安装包在光盘里的"Packages"目录下。

```
[root@localhost /]# ls /media/RHEL_6.3\ i386\ Disc\ 1/Packages/device*
/media/RHEL_6.3 i386 Disc 1/Packages/device-mapper-1.02.74-10.el6.i686.rpm
/media/RHEL_6.3 i386 Disc 1/Packages/device-mapper-event-1.02.74-10.el6.i686.rpm
/media/RHEL_6.3 i386 Disc 1/Packages/device-mapper-event-libs-1.02.74-10.el6.i68
6.rpm
/media/RHEL_6.3 i386 Disc 1/Packages/device-mapper-libs-1.02.74-10.el6.i686.rpm
/media/RHEL_6.3 i386 Disc 1/Packages/device-mapper-multipath-0.4.9-56.el6.i686.r
pm
/media/RHEL_6.3 i386 Disc 1/Packages/device-mapper-multipath-libs-0.4.9-56.el6.i
686.rpm
/media/RHEL_6.3 i386 Disc 1/Packages/device-mapper-persistent-data-0.1.4-1.el6.i
686.rpm
```

4.先装链接库文件,否则会提示依赖的库不可用，不能安装。

```
[root@localhost Packages]# yum install device-mapper-multipath-libs-0.4.9-56.el6.i686.rpm
Loaded plugins: product-id, refresh-packagekit, security, subscription-manager
Updating certificate-based repositories.
Unable to read consumer identity
Setting up Install Process
Examining device-mapper-multipath-libs-0.4.9-56.el6.i686.rpm: device-mapper-multipath-libs-0.4.9-56.el6.i686
Marking device-mapper-multipath-libs-0.4.9-56.el6.i686.rpm to be installed
Resolving Dependencies
--> Running transaction check
---> Package device-mapper-multipath-libs.i686 0:0.4.9-56.el6 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

================================================================================
 Package                    Arch     Version          Repository
================================================================================
Installing:
 device-mapper-multipath-libs     i686     0.4.9-56.el6     /device-mapper-multipath-libs-0.4.9-56.el6.i686

Transaction Summary
================================================================================
Install       1 Package(s)

Total size: 371 k
Installed size: 371 k
Is this ok [y/N]: y
Downloading Packages:
Running rpm_check_debug
Running Transaction Test
Transaction Test Succeeded
Running Transaction
  Installing : device-mapper-multipath-libs-0.4.9-56.el6.i686
Installed products updated.
  Verifying  : device-mapper-multipath-libs-0.4.9-56.el6.i686
```

5．再装多路径包

```
[root@localhost Packages]# yum install device-mapper-multipath-0.4.9-56.el6.i686.rpm
Loaded plugins: product-id, refresh-packagekit, security, subscription-manager
Updating certificate-based repositories.
Unable to read consumer identity
Setting up Install Process
Examining device-mapper-multipath-0.4.9-56.el6.i686.rpm: device-mapper-multipath-0.4.9-56.el6.i686
Marking device-mapper-multipath-0.4.9-56.el6.i686.rpm to be installed
Resolving Dependencies
--> Running transaction check
---> Package device-mapper-multipath.i686 0:0.4.9-56.el6 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

================================================================================
 Package                Arch       Version              Repository                                  Size
================================================================================
Installing:
 device-mapper-multipath      i686       0.4.9-56.el6         /device-mapper-multipath-0.4.9-56.el6.i686      167 k

Transaction Summary
================================================================================
Install       1 Package(s)

Total size: 167 k
Installed size: 167 k
Is this ok [y/N]: y
Downloading Packages:
Running rpm_check_debug
Running Transaction Test
Transaction Test Succeeded
Running Transaction
  Installing : device-mapper-multipath-0.4.9-56.el6.i686                         1/1
Installed products updated.
  Verifying  : device-mapper-multipath-0.4.9-56.el6.i686                         1/1

Installed:
  device-mapper-multipath.i686 0:0.4.9-56.el6

Complete!
```

6．多路径包已安装，将其设为启动时自动加载，但用 multipath –ll 时报错，提示没有 multipath.conf.

(在 Redhat 6.x 上默认/etc 下没有 multipath.conf 的多路径配置文件)

```
[root@localhost Packages]# chkconfig --levels 2345 multipathd on
[root@localhost Packages]# chkconfig multipathd --list
multipathd      0:off   1:off   2:on    3:on    4:on    5:on    6:off
[root@localhost Packages]# multipath --ll
Nov 23 20:04:13 | DM multipath kernel driver not loaded
Nov 23 20:04:13 | /etc/multipath.conf does not exist, blacklisting all devices.
Nov 23 20:04:13 | A sample multipath.conf file is located at
Nov 23 20:04:13 | /usr/share/doc/device-mapper-multipath-0.4.9/multipath.conf
Nov 23 20:04:13 | You can run /sbin/mpathconf to create or modify /etc/multipath
.conf
Nov 23 20:04:13 | DM multipath kernel driver not loaded
```

7. 用 mpatchconf - -enable 生成 multipath.conf (按上图提示运行/sbin/mpathconf 如果不加参数 “—enable”不会生成 multipath.conf.也可以按上面提示将/usr/share/doc/.../mulitpath.conf 文件复制到/etc 下)

```
[root@localhost /]# mpathconf --enable
[root@localhost /]# ls /etc/multipath.conf
/etc/multipath.conf
```

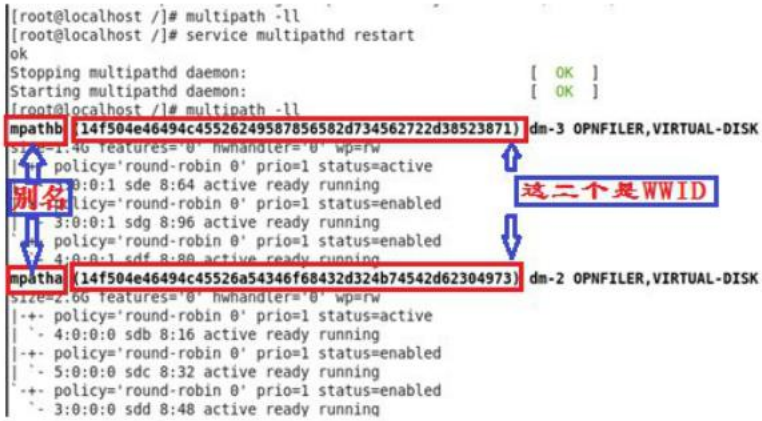
8.再次运行 multipath –ll 不报错了，但没有显示出对应的盘，重启一下 multipathd 服务，再运行一次，二个盘 mpatha, mpathb 显示出来.

```
[root@localhost /]# multipath -ll
[root@localhost /]# service multipathd restart
ok
Stopping multipathd daemon:                                [  OK  ]
Starting multipathd daemon:                                [  OK  ]
[root@localhost /]# multipath -ll
mpathb (14f504e46494c45526249587856582d734562722d38523871) dm-3 OPNFILER,VIRTUAL-DISK
size=1.4G features='0' hwhandler='0' wp=rw
|-+- policy='round-robin 0' prio=1 status=active
| `- 5:0:0:1 sde 8:64 active ready running
|-+- policy='round-robin 0' prio=1 status=enabled
| `- 3:0:0:1 sdg 8:96 active ready running
`-+- policy='round-robin 0' prio=1 status=enabled
  `- 4:0:0:1 sdf 8:80 active ready running
mpatha (14f504e46494c45526a54346f68432d324b74542d62304973) dm-2 OPNFILER,VIRTUAL-DISK
size=2.0G features='0' hwhandler='0' wp=rw
|-+- policy='round-robin 0' prio=1 status=active
| `- 4:0:0:0 sdb 8:16 active ready running
|-+- policy='round-robin 0' prio=1 status=enabled
| `- 5:0:0:0 sdc 8:32 active ready running
`-+- policy='round-robin 0' prio=1 status=enabled
  `- 3:0:0:0 sdd 8:48 active ready running
```

9. 编辑/etc/multipath.conf 文件（记得先保存一个备份，预防万一）。将原始的 multipath.conf 文件中从 multipaths 到 devices 前的”#”去掉

```
## devnode lines are not recommended for blacklisting specific devices.
##
#blacklist {
#       wwid 26353900f02796769
#       devnode "^(ram|raw|loop|fd|md|dm-|sr|scd|st)[0-9]*"
#       devnode "^hd[a-z]"
#}
multipaths {
        multipath {
                wwid                    3600508b4000156d70001200000040000
                alias                   yellow
                path_grouping_policy    multibus
                path_checker            readsector0
                path_selector           "round-robin 0"
                failback                manual
                rr_weight               priorities
                no_path_retry           5
        }
        multipath {
                wwid                    1DEC_____321816758474
                alias                   red
        }
}
#devices {
#       device {
#               vendor                  "COMPAQ  "
#               product                 "HSV110 (C)COMPAQ"
#               path_grouping_policy    multibus
#               getuid_callout          "/lib/udev/scsi_id --whitelisted --device=/dev/%n"
```

10.将 multipath –ll 看到的盘对应的 wwid 替换原始文件中的 WWID，别名可以随便取为自己方便识别的名字。如果有多个盘，可以复制 multipath 及其括号里的内容，同样替换 WWID 及取别名。



11.替换后的 multipath.conf. 此示例有二个盘，分别将其别名取为 SalesDate 和 game.

```
multipaths {
        multipath {
                wwid                    14f504e46494c45526249587856582d734562722d38523871
                alias                   SalesData
                path_grouping_policy    multibus
                path_selector           "round-robin 0"
                failback                manual
                rr_weight               priorities
                no_path_retry           5
        }
        multipath {
                wwid                    14f504e46494c45526a54346f68432d324b74542d62304973
                alias                   games
                path_grouping_policy    multibus
                path_selector           "round-robin 0"
                failback                manual
                rr_weight               priorities
                no_path_retry           5
        }
}
```

12.将 multipathd 服务重启后，再用 multipath –ll 查看，可以看到别名变为新取的名字。

```
[root@localhost tap]# service multipathd restart
ok
Stopping multipathd daemon:                                [  OK  ]
Starting multipathd daemon:                                [  OK  ]
[root@localhost tap]# multipath -ll
SalesData (14f504e46494c45526249587856582d734562722d38523871) dm-3 OPNFILER,VIRTUAL-DISK
size=1.4G features='1 queue_if_no_path' hwhandler='0' wp=rw
`-+- policy='round-robin 0' prio=1 status=active
  |- 5:0:0:1 sde 8:64 active ready running
  |- 3:0:0:1 sdg 8:96 active ready running
  `- 4:0:0:1 sdf 8:80 active ready running
games (14f504e46494c45526a54346f68432d324b74542d62304973) dm-2 OPNFILER,VIRTUAL-DISK
size=2.6G features='1 queue_if_no_path' hwhandler='0' wp=rw
`-+- policy='round-robin 0' prio=1 status=active
  |- 4:0:0:0 sdb 8:16 active ready running
  |- 5:0:0:0 sdc 8:32 active ready running
  `- 3:0:0:0 sdd 8:48 active ready running
```

13.将对应的多路径盘直接初始化为 ext4 文件系统

```
[root@localhost Desktop]# mkfs.ext4 /dev/mapper/SalesData
mke2fs 1.41.12 (17-May-2010)
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
94272 inodes, 376832 blocks
18841 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=385875968
12 block groups
32768 blocks per group, 32768 fragments per group
7856 inodes per group
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912

Writing inode tables: done
Creating journal (8192 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.
```

14.查看对应的盘在/dev/mapper/下,将其 mount 至相应的目录。

```
[root@localhost Desktop]# cd /dev/mapper/
[root@localhost mapper]# ls
control  games  gamespl  SalesData  VolGroup-lv_root  VolGroup-lv_swap
[root@localhost mapper]# mount /dev/mapper/SalesData /mnt/salesdata/
```

15.对 mount 后的盘做复制并查看结果，OK。

```
[root@localhost mapper]# cp /etc/* /mnt/salesdata/
cp: omitting directory `/etc/abrt'
cp: omitting directory `/etc/acpi'
cp: omitting directory `/etc/alsa'
cp: omitting directory `/etc/alternatives'
cp: omitting directory `/etc/audisp'
cp: omitting directory `/etc/audit'
cp: omitting directory `/etc/avahi'
cp: omitting directory `/etc/bash_completion.d'
cp: omitting directory `/etc/blkid'
cp: omitting directory `/etc/bluetooth'
cp: omitting directory `/etc/bonobo-activation'
```

```
[root@localhost mapper]# ls /mnt/salesdata/
adjtime                 fprintd.conf      lynx-site.cfg              rc
aliases                 fstab             magic                      rc.local
aliases.db              gai.conf          mailcap                    rc.sysinit
anacrontab              group             mail.rc                    readahead.conf
anthy-conf              group-            man.config                 redhat-release
asound.conf             grub.conf         mime.types                 request-key.conf
```

16.最后如果需要启动过程自动 mount,在编辑 fstab 时，在 Defaults 前记得加上参数“_netdev”.此参数的意思是说在网络服务启动完成后再执行 mount 操作,否则启动过程可能报错。

```
# /etc/fstab
# Created by anaconda on Thu Nov 22 20:59:54 2012
#
# 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
#
/dev/mapper/VolGroup-lv_root /                       ext4    defaults
UUID=7c0a854c-1cb2-447f-ae69-5cfd14f1c5fe /boot                   ext4    def
/dev/mapper/VolGroup-lv_swap swap                    swap    defaults
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/mapper/SalesData  /mnt/salesdata/          ext4    _netdev,defaults  0 0
```

关于在 MD 系列上配置时的进一步优级化。

在 MD 系列上配置多路径时，如果用 multipath –ll 时会显示 Access Lun，可以通过将 Access Lun 的 WWID 加入 blacklist 来屏蔽其显示，具体如下：