1、实现下表 dump 备份场景，观察并分别对比不同备份设备下的 Full backup 性能并记录过程与结果：

From	To
var	Linear LV
etc	Stripe LV
boot	Mirror LV
lib	RAID5 Vol

将 Linear LV 备份到 var 下，如图 1-1。

```
[root@server ~]# dump -0f /dev/vg/lv /var
  DUMP: Date of this level 0 dump: Fri Sep 14 10:55:15 2018
  DUMP: Dumping /dev/vda2 (/ (dir var)) to /dev/vg/lv
  DUMP: Label: none
  DUMP: Writing 10 Kilobyte records
  DUMP: mapping (Pass I) [regular files]
  DUMP: mapping (Pass II) [directories]
  DUMP: estimated 170259 blocks.
  DUMP: Volume 1 started with block 1 at: Fri Sep 14 10:55:15 2018
  DUMP: dumping (Pass III) [directories]
  DUMP: dumping (Pass IV) [regular files]
  DUMP: Closing /dev/vg/lv
  DUMP: Volume 1 completed at: Fri Sep 14 10:55:22 2018
  DUMP: Volume 1 172070 blocks (168.04MB)
  DUMP: Volume 1 took 0:00:07
  DUMP: Volume 1 transfer rate: 24581 kB/s
  DUMP: 172070 blocks (168.04MB) on 1 volume(s)
  DUMP: finished in 7 seconds, throughput 24581 kBytes/sec
  DUMP: Date of this level 0 dump: Fri Sep 14 10:55:15 2018
  DUMP: Date this dump completed:  Fri Sep 14 10:55:22 2018
  DUMP: Average transfer rate: 24581 kB/s
  DUMP: DUMP IS DONE
```

图 1-1

将 Stripe LV 备份到 etc 下，如图 1-2。

```
[root@server ~]# dump -0f /dev/s_stripe/l_stripe /etc
  DUMP: Date of this level 0 dump: Fri Sep 14 11:02:49 2018
  DUMP: Dumping /dev/vda2 (/ (dir etc)) to /dev/s_stripe/l_stripe
  DUMP: Label: none
  DUMP: Writing 10 Kilobyte records
  DUMP: mapping (Pass I) [regular files]
  DUMP: mapping (Pass II) [directories]
  DUMP: estimated 35756 blocks.
  DUMP: Volume 1 started with block 1 at: Fri Sep 14 11:02:49 2018
  DUMP: dumping (Pass III) [directories]
  DUMP: dumping (Pass IV) [regular files]
  DUMP: Closing /dev/s_stripe/l_stripe
  DUMP: Volume 1 completed at: Fri Sep 14 11:02:51 2018
  DUMP: Volume 1 39800 blocks (38.87MB)
  DUMP: Volume 1 took 0:00:02
  DUMP: Volume 1 transfer rate: 19900 kB/s
  DUMP: 39800 blocks (38.87MB) on 1 volume(s)
  DUMP: finished in 2 seconds, throughput 19900 kBytes/sec
  DUMP: Date of this level 0 dump: Fri Sep 14 11:02:49 2018
  DUMP: Date this dump completed:  Fri Sep 14 11:02:51 2018
  DUMP: Average transfer rate: 19900 kB/s
  DUMP: DUMP IS DONE
```

图 1-2

将 Mirror LV 备份到 boot 下，如图 1-3。

```
[root@server ~]# dump -0f /dev/vg_mirror/lv_mirror /boot
  DUMP: Date of this level 0 dump: Fri Sep 14 11:06:39 2018
  DUMP: Dumping /dev/vdb1 (/boot) to /dev/vg_mirror/lv_mirror
  DUMP: Label: none
  DUMP: Writing 10 Kilobyte records
  DUMP: mapping (Pass I) [regular files]
  DUMP: mapping (Pass II) [directories]
  DUMP: estimated 152027 blocks.
  DUMP: Volume 1 started with block 1 at: Fri Sep 14 11:06:39 2018
  DUMP: dumping (Pass III) [directories]
  DUMP: dumping (Pass IV) [regular files]
  DUMP: Closing /dev/vg_mirror/lv_mirror
  DUMP: Volume 1 completed at: Fri Sep 14 11:06:44 2018
  DUMP: Volume 1 151880 blocks (148.32MB)
  DUMP: Volume 1 took 0:00:05
  DUMP: Volume 1 transfer rate: 30376 kB/s
  DUMP: 151880 blocks (148.32MB) on 1 volume(s)
  DUMP: finished in 4 seconds, throughput 37970 kBytes/sec
  DUMP: Date of this level 0 dump: Fri Sep 14 11:06:39 2018
  DUMP: Date this dump completed:  Fri Sep 14 11:06:44 2018
  DUMP: Average transfer rate: 30376 kB/s
  DUMP: DUMP IS DONE
```

图 1-3

将 RAID5 Vol 备份到 lib 下，如图 1-4

```
[root@server ~]# dump -0f /dev/md5 /lib
  DUMP: Date of this level 0 dump: Fri Sep 14 11:11:10 2018
  DUMP: Dumping /dev/vda2 (/ (dir usr/lib)) to /dev/md5
  DUMP: Label: none
  DUMP: Writing 10 Kilobyte records
  DUMP: mapping (Pass I) [regular files]
  DUMP: mapping (Pass II) [directories]
  DUMP: estimated 397120 blocks.
  DUMP: Volume 1 started with block 1 at: Fri Sep 14 11:11:10 2018
  DUMP: dumping (Pass III) [directories]
  DUMP: dumping (Pass IV) [regular files]
  DUMP: Closing /dev/md5
  DUMP: Volume 1 completed at: Fri Sep 14 11:11:34 2018
  DUMP: Volume 1 411050 blocks (401.42MB)
  DUMP: Volume 1 took 0:00:24
  DUMP: Volume 1 transfer rate: 17127 kB/s
  DUMP: 411050 blocks (401.42MB) on 1 volume(s)
  DUMP: finished in 23 seconds, throughput 17871 kBytes/sec
  DUMP: Date of this level 0 dump: Fri Sep 14 11:11:10 2018
  DUMP: Date this dump completed:  Fri Sep 14 11:11:34 2018
  DUMP: Average transfer rate: 17127 kB/s
  DUMP: DUMP IS DONE
```

图 1-4

2、完全解开/boot/initramfs-x.xxx.img 文件内容并放置到/boot/test 目录内，将/boot/test/bin 下所有文件标记为 nodump，依据上表备份结果对 boot 目录进行增量备份，记录过程与结果。

完全解开/boot/initramfs-x.xxx.img 文件内容并放置到/boot/test 目录内，如图 2-1。

```
[root@server test]# cp /boot/initramfs-3.10.0-693.el7.x86_64.img /boot/test
[root@server test]# ls
initramfs-3.10.0-693.el7.x86_64.gz  initramfs-3.10.0-693.el7.x86_64.img
[root@server test]# cpio -i < initramfs-3.10.0-693.el7.x86_64.img^C
[root@server test]# cpio -i < initramfs-3.10.0-693.el7.x86_64.img
75536 块
[root@server test]# ls
bin  init                                  lib    root  shutdown  tmp
dev  initramfs-3.10.0-693.el7.x86_64.gz    lib64  run   sys       usr
etc  initramfs-3.10.0-693.el7.x86_64.img   proc   sbin  sysroot   var
```

图 2-1

将/boot/test/bin 下所有文件标记为 nodump，如图 2-2。

```
[root@server test]# chattr -R +d /boot/test/bin/*
chattr: 不支持的操作 while reading flags on /boot/test/bin/awk
chattr: 不支持的操作 while reading flags on /boot/test/bin/loginctl
chattr: 不支持的操作 while reading flags on /boot/test/bin/sh
[root@server test]#
```

图 2-2

依据第一题备份结果对 boot 目录进行增量备份，如图 2-3。

```
[root@server ~]# dump -1f /dev/vg_mirror/lv_mirror /boot
  DUMP: WARNING: There is no inferior level dump on this filesystem
  DUMP: WARNING: Assuming a level 0 dump by default
  DUMP: Date of this level 0 dump: Fri Sep 14 18:12:19 2018
  DUMP: Dumping /dev/vdb1 (/boot) to /dev/vg_mirror/lv_mirror
  DUMP: Label: none
  DUMP: Writing 10 Kilobyte records
  DUMP: mapping (Pass I) [regular files]
  DUMP: mapping (Pass II) [directories]
  DUMP: estimated 269855 blocks.
  DUMP: Volume 1 started with block 1 at: Fri Sep 14 18:12:19 2018
  DUMP: dumping (Pass III) [directories]
  DUMP: dumping (Pass IV) [regular files]
  DUMP: Closing /dev/vg_mirror/lv_mirror
  DUMP: Volume 1 completed at: Fri Sep 14 18:12:26 2018
  DUMP: Volume 1 269600 blocks (263.28MB)
  DUMP: Volume 1 took 0:00:07
  DUMP: Volume 1 transfer rate: 38514 kB/s
  DUMP: 269600 blocks (263.28MB) on 1 volume(s)
  DUMP: finished in 7 seconds, throughput 38514 kBytes/sec
  DUMP: Date of this level 0 dump: Fri Sep 14 18:12:19 2018
  DUMP: Date this dump completed:  Fri Sep 14 18:12:26 2018
  DUMP: Average transfer rate: 38514 kB/s
  DUMP: DUMP IS DONE
```

图 2-3

3、删除/boot/test 目录，然后将所有 boot 目录的备份还原至当前 boot 目录，记录过程与结果。

删除/boot/test 目录，如图 3-1。

图 3-1

将所有 boot 目录的备份还原至当前 boot 目录，如图 3-2。

图 3-2

```
[root@server boot]# restore -vrf /dev/vg_mirror/lv_mirror
Verify tape and initialize maps
Input is from a local file/pipe
Input block size is 32
Dump   date: Fri Sep 14 18:12:19 2018
Dumped from: the epoch
Level 0 dump of /boot on server:/dev/vdb1
Label: none
Begin level 0 restore
Initialize symbol table.
Extract directories from tape
Calculate extraction list.
restore: ./lost+found: File exists
restore: ./dev: File exists
restore: ./efi: File exists
restore: ./efi/EFI: File exists
restore: ./efi/EFI/centos: File exists
restore: ./etc: File exists
restore: ./etc/modprobe.d: File exists
restore: ./etc/systemd: File exists
restore: ./etc/plymouth: File exists
restore: ./etc/sysctl.d: File exists
restore: ./etc/libnl: File exists
restore: ./etc/cmdline.d: File exists
restore: ./etc/udev: File exists
restore: ./etc/udev/rules.d: File exists
restore: ./etc/ld.so.conf.d: File exists
restore: ./etc/conf.d: File exists
restore: ./grub: File exists
restore: ./grub2: File exists
restore: ./grub2/i386-pc: File exists
restore: ./grub2/locale: File exists
```

查看下是否备份成功，如图 3-3

```
[root@server boot]# ls
2.txt
4.txt
5.txt
6.txt
aquota.group
aquota.user
bin
config-3.10.0-693.el7.x86_64
dev
efi
etc
grub
grub2
init
initramfs-0-rescue-47b99ec655f14ad79581ced5a859a2fc.img
initramfs-3.10.0-693.el7.x86_64.img
initrd-plymouth.img
lib
lib64
lost+found
proc
restoresymtable
root
run
sbin
shutdown
symvers-3.10.0-693.el7.x86_64.gz
sys
sysroot
System.map-3.10.0-693.el7.x86_64
test
tmp
user4.txt
usr
```

、

图 3-3

4、将 boot 目录增量备份内容中/boot/test/lib 所有内容还原至/root/test 目录，记录过程与结果。

将 boot 目录增量备份内容中/boot/test/lib 所有内容还原至/root/test 目录，如图 4-1。

```
[root@server test]# restore -xf /dev/vg_mirror/lv_mirror /test/usr/lib
restore: ./test: File exists
You have not read any volumes yet.
Unless you know which volume your file(s) are on you should start
with the last volume and work towards the first.
Specify next volume # (none if no more volumes): 1
set owner/mode for '.'? [yn] y
[root@server test]#
[root@server test]#
[root@server test]# ls
1.txt  2.txt  3.txt  4.txt  5.txt  6.txt  bak.tar  test
[root@server test]# ls test
lib  usr
[root@server test]# ls test/usr
lib
[root@server test]# ls test/usr/lib
dracut         fs-lib.sh  modprobe.d  net-lib.sh  systemd     udev
dracut-lib.sh  kbd        modules     sysctl.d    tmpfiles.d
[root@server test]#
```

图 4-1