

отчёта по лабораторной работе №15

Управление логическими томами

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1 Цель работы

Получить навыки управления логическими томами.

2 Задание

1. Продемонстрировать навыки создания физических томов на LVM (см. раздел 15.4.1).
2. Продемонстрировать навыки создания группы томов и логических томов на LVM (см. раздел 15.4.2).
3. Продемонстрировать навыки изменения размера логических томов на LVM (см. раздел 15.4.3).
4. Выполнить задание для самостоятельной работы (см. раздел 15.5). ом.

3 Выполнение лабораторной работы

3.1 Создание физического тома

Сначала этой лабораторной работы я открыл терминал и получил полномочия администратора. Потом я открыл файл `/etc/fstab` с помощью текстового редактора `vim` чтобы комментировать строку, которая автомонтирует `/mnt/data` (рис. 3.1) потом я сохранил файл

```
vim /etc/fstab  
#  
:wq
```




```
root@localhost:~  
[qjarishekk@localhost ~]$ su -  
Password:  
su: Authentication failure  
[qjarishekk@localhost ~]$  
[qjarishekk@localhost ~]$ su -  
Password:  
[root@localhost ~]# vim /etc/fstab  
[root@localhost ~]# umount /mnt/data  
[root@localhost ~]#
```

Рис. 3.2: отмонтирование каталога /mnt/data

Затем я убедился что я правильно отмонтировал каталог (рис. 3.3).

umount

```
root@localhost:~# mouont
bash: mouont: command not found...
root@localhost:~# mount
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime,seclabel)
devtmpfs on /dev type devtmpfs (rw,nosuid,seclabel,size=4096k,nr_inodes=2006233,mode=755,inode64)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev,seclabel,inode64)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,seclabel,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,nodev,seclabel,size=322544k,nr_inodes=819200,mode=755,inode64)
cgroup2 on /sys/fs/cgroup type cgroup2 (rw,nosuid,nodev,noexec,relatime,seclabel,nsdelegate,memory_recursiveprot)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime,seclabel)
bpf on /sys/fs/bpf type bpf (rw,nosuid,nodev,noexec,relatime,mode=700)
/dev/mapper/rl-root on / type xfs (rw,relatime,seclabel,attr2,inode64,logbufs=8,logbsize=32k,noquota)
selinuxfs on /sys/fs/selinux type selinuxfs (rw,nosuid,noexec,relatime)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=29,pgrp=1,timeout=0,minproto=5,maxproto=5,direct,pipe_ino=23137)
mqueue on /dev/mqueue type mqueue (rw,nosuid,nodev,noexec,relatime,seclabel)
debugfs on /sys/kernel/debug type debugfs (rw,nosuid,nodev,noexec,relatime,seclabel)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime,seclabel,pagesize=2M)
tracefs on /sys/kernel/tracing type tracefs (rw,nosuid,nodev,noexec,relatime,seclabel)
fusectl on /sys/fs/fuse/connections type fusectl (rw,nosuid,nodev,noexec,relatime)
configfs on /sys/kernel/config type configfs (rw,nosuid,nodev,noexec,relatime)
none on /run/credentials/systemd-sysctl.service type ramfs (ro,nosuid,nodev,noexec,relatime,seclabel,mode=700)
none on /run/credentials/systemd-tmpfiles-setup-dev.service type ramfs (ro,nosuid,nodev,noexec,relatime,seclabel,mode=700)
/dev/sda1 on /boot type xfs (rw,relatime,seclabel,attr2,inode64,logbufs=8,logbsize=32k,noquota)
/dev/mapper/rl-home on /home type xfs (rw,relatime,seclabel,attr2,inode64,logbufs=8,logbsize=32k,noquota)
none on /run/credentials/systemd-tmpfiles-setup.service type ramfs (ro,nosuid,nodev,noexec,relatime,seclabel,mode=700)
tmpfs on /run/user/1000 type tmpfs (rw,nosuid,nodev,relatime,seclabel,size=1611268k,nr_inodes=402817,mode=700,uid=1000,gid=1000,inode64)
gvfsd-fuse on /run/user/1000/gvfs type fuse.gvfsd-fuse (rw,nosuid,nodev,relatime,user_id=1000,group_id=1000)
/dev/sr0 on /run/media/qjarishekk/VBox_GAs_7.0.18 type iso9660 (ro,nosuid,nodev,relatime,nojoliet,check=s,map=n,blocksize=2048,uid=1000,gid=1000,dmode=500,fmode=400,uhelper=udisks2)
portal on /run/user/1000/doc type fuse.portal (rw,nosuid,nodev,relatime,user_id=1000,group_id=1000)
root@localhost:~#
```

Рис. 3.3: проверка отмонтирования

Потом я использовал утилит fdisk чтобы удалить все партиии (рис. 3.4).

```
fdisk /dev/sdb
```

```
p
```

```
ENTER
```

```
0
```

```
ENTER
```

```
p
```

```
ENTER
```

```
w
```

```
ENTER
```

```
root@localhost:~  
[root@localhost ~]# fdisk /dev/sdb  
Welcome to fdisk (util-linux 2.37.4).  
Changes will remain in memory only, until you decide to write them.  
Be careful before using the write command.  
  
Command (m for help): p  
Disk /dev/sdb: 512 MiB, 536870912 bytes, 1048576 sectors  
Disk model: VBOX HARDDISK  
Units: sectors of 1 * 512 = 512 bytes  
Sector size (logical/physical): 512 bytes / 512 bytes  
I/O size (minimum/optimal): 512 bytes / 512 bytes  
Disklabel type: dos  
Disk identifier: 0xc55b68fc  
  
Device      Boot  Start    End Sectors  Size Id Type  
/dev/sdb1             2048   206847   204800  100M 83 Linux  
/dev/sdb2          206848 1048575   841728  411M  5 Extended  
/dev/sdb5          208896  415743   206848  101M 83 Linux  
/dev/sdb6          417792  622591   204800  100M 82 Linux swap / Solaris  
  
Command (m for help): o  
Created a new DOS disklabel with disk identifier 0x3adb53e.  
  
Command (m for help): p  
Disk /dev/sdb: 512 MiB, 536870912 bytes, 1048576 sectors  
Disk model: VBOX HARDDISK  
Units: sectors of 1 * 512 = 512 bytes  
Sector size (logical/physical): 512 bytes / 512 bytes  
I/O size (minimum/optimal): 512 bytes / 512 bytes  
Disklabel type: dos  
Disk identifier: 0x3adb53e  
  
Command (m for help): w  
The partition table has been altered.  
Calling ioctl() to re-read partition table.  
Syncing disks.  
  
[root@localhost ~]#
```

Рис. 3.4: удаление партиций

Потом я изменил таблицу разделов ядра (рис. 3.5) и проверил списку

```
partprobe /dev/sdb  
fdisk --list /dev/sdb
```

```
root@localhost:~  
Welcome to fdisk (util-linux 2.37.4).  
Changes will remain in memory only, until you decide to write them.  
Be careful before using the write command.  
  
Command (m for help): p  
Disk /dev/sdb: 512 MiB, 536870912 bytes, 1048576 sectors  
Disk model: VBOX HARDDISK  
Units: sectors of 1 * 512 = 512 bytes  
Sector size (logical/physical): 512 bytes / 512 bytes  
I/O size (minimum/optimal): 512 bytes / 512 bytes  
Disklabel type: dos  
Disk identifier: 0xc55b68fc  
  
Device Boot Start End Sectors Size Id Type  
/dev/sdb1 2048 206847 204800 100M 83 Linux  
/dev/sdb2 206848 1048575 841728 411M 5 Extended  
/dev/sdb5 208896 415743 206848 101M 83 Linux  
/dev/sdb6 417792 622591 204800 100M 82 Linux swap / Solaris  
  
Command (m for help): o  
Created a new DOS disklabel with disk identifier 0x3adb53e.  
  
Command (m for help): p  
Disk /dev/sdb: 512 MiB, 536870912 bytes, 1048576 sectors  
Disk model: VBOX HARDDISK  
Units: sectors of 1 * 512 = 512 bytes  
Sector size (logical/physical): 512 bytes / 512 bytes  
I/O size (minimum/optimal): 512 bytes / 512 bytes  
Disklabel type: dos  
Disk identifier: 0x3adb53e  
  
Command (m for help): w  
The partition table has been altered.  
Calling ioctl() to re-read partition table.  
Syncing disks.  
  
[root@localhost ~]# partprobe /dev/sdb  
[root@localhost ~]# fdisk --list /dev/sdb  
Disk /dev/sdb: 512 MiB, 536870912 bytes, 1048576 sectors  
Disk model: VBOX HARDDISK  
Units: sectors of 1 * 512 = 512 bytes  
Sector size (logical/physical): 512 bytes / 512 bytes  
I/O size (minimum/optimal): 512 bytes / 512 bytes  
Disklabel type: dos  
Disk identifier: 0x3adb53e  
[root@localhost ~]#
```

Рис. 3.5: изменение и проверка таблицу разделов ядра

Дальше я создал новую партицию с форматом Linux LVM с помощью утилита fdisk (рис. 3.6).

```
n  
p  
ENTER  
+100Mib  
t  
8e  
w
```

```
root@localhost:~  
Command (m for help): t  
Selected partition 1  
Hex code or alias (type L to list all): L  


|                    |                    |                    |                    |
|--------------------|--------------------|--------------------|--------------------|
| 00 Empty           | 24 NEC DOS         | 81 Minix / old Lin | bf Solaris         |
| 01 FAT12           | 27 Hidden NTFS Win | 82 Linux swap / So | c1 DRDOS/sec (FAT- |
| 02 XENIX root      | 39 Plan 9          | 83 Linux           | c4 DRDOS/sec (FAT- |
| 03 XENIX usr       | 3c PartitionMagic  | 84 OS/2 hidden or  | c6 DRDOS/sec (FAT- |
| 04 FAT16 <32M      | 40 Venix 80286     | 85 Linux extended  | c7 Syrix           |
| 05 Extended        | 41 PPC PReP Boot   | 86 NTFS volume set | da Non-FS data     |
| 06 FAT16           | 42 SFS             | 87 NTFS volume set | db CP/M / CTOS / . |
| 07 HPFS/NTFS/exFAT | 4d QNX4.x          | 88 Linux plaintext | de Dell Utility    |
| 08 AIX             | 4e QNX4.x 2nd part | 8e Linux LVM       | df BootIt          |
| 09 AIX bootable    | 4f QNX4.x 3rd part | 93 Amoebe          | e1 DOS access      |
| 0a OS/2 Boot Manag | 50 OnTrack DM      | 94 Amoebe BBT      | e3 DOS R/O         |
| 0b W95 FAT32       | 51 OnTrack DM6 Aux | 9f BSD/OS          | e4 SpeedStor       |
| 0c W95 FAT32 (LBA) | 52 CP/M            | a0 IBM Thinkpad hi | ea Linux extended  |
| 0e W95 FAT16 (LBA) | 53 OnTrack DM6 Aux | a5 FreeBSD         | eb BeOS fs         |
| 0f W95 Ext'd (LBA) | 54 OnTrackDM6      | a6 OpenBSD         | ee GPT             |
| 10 OPUS            | 55 EZ-Drive        | a7 NeXTSTEP        | ef EFI (FAT-12/16/ |
| 11 Hidden FAT12    | 56 Golden Bow      | a8 Darwin UFS      | f0 Linux/PA-RISC b |
| 12 Compaq diagnost | 5c Priam Edisk     | a9 NetBSD          | f1 SpeedStor       |
| 14 Hidden FAT16 <3 | 61 SpeedStor       | ab Darwin boot     | f4 SpeedStor       |
| 16 Hidden FAT16    | 63 GNU HURD or Sys | af HFS / HFS+      | f2 DOS secondary   |
| 17 Hidden HPFS/NTF | 64 Novell Netware  | b7 BSDI fs         | fb VMware VMFS     |
| 18 AST SmartSleep  | 65 Novell Netware  | b8 BSDI swap       | fc VMware VMKCORE  |
| 1b Hidden W95 FAT3 | 70 DiskSecure Mult | bb Boot Wizard hid | fd Linux raid auto |
| 1c Hidden W95 FAT3 | 75 PC/IX           | bc Acronis FAT32 L | fe LANstep         |
| 1e Hidden W95 FAT1 | 80 Old Minix       | be Solaris boot    | ff BBT             |

  
Aliases:  
linux - 83  
swap - 82  
extended - 05  
uefi - EF  
raid - FD  
lvm - 8E  
linuxex - 85  
Hex code or alias (type L to list all): 8e  
Changed type of partition 'Linux' to 'Linux LVM'.  
Command (m for help): w  
The partition table has been altered.  
Calling ioctl() to re-read partition table.  
Syncing disks.  
[root@localhost ~]#
```

Рис. 3.6: создание партиции

Потом я еще раз обновил таблицу разделов (рис. 3.7).

```
partprobe /dev/sdb
```

```
root@localhost:~  
Command (m for help): t  
Selected partition 1  
Hex code or alias (type L to list all): L  


|                    |                    |                    |                    |
|--------------------|--------------------|--------------------|--------------------|
| 00 Empty           | 24 NEC DOS         | 81 Minix / old Lin | bf Solaris         |
| 01 FAT12           | 27 Hidden NTFS Win | 82 Linux swap / So | c1 DRDOS/sec (FAT- |
| 02 XENIX root      | 39 Plan 9          | 83 Linux           | c4 DRDOS/sec (FAT- |
| 03 XENIX usr       | 3c PartitionMagic  | 84 OS/2 hidden or  | c6 DRDOS/sec (FAT- |
| 04 FAT16 <32M      | 40 Venix 80286     | 85 Linux extended  | c7 Syrinx          |
| 05 Extended        | 41 PPC PReP Boot   | 86 NTFS volume set | da Non-FS data     |
| 06 FAT16           | 42 SFS             | 87 NTFS volume set | db CP/M / CTOs / . |
| 07 HPFS/NTFS/exFAT | 4d QNX4.x          | 88 Linux plaintext | de Dell Utility    |
| 08 AIX             | 4e QNX4.x 2nd part | 8e Linux LVM       | df BootIt          |
| 09 AIX bootable    | 4f QNX4.x 3rd part | 93 Amoebe          | e1 DOS access      |
| 0a OS/2 Boot Manag | 50 OnTrack DM      | 94 Amoebe BBT      | e3 DOS R/O         |
| 0b W95 FAT32       | 51 OnTrack DM6 Aux | 9f BSD/OS          | e4 SpeedStor       |
| 0c W95 FAT32 (LBA) | 52 CP/M            | a0 IBM Thinkpad hi | ea Linux extended  |
| 0e W95 FAT16 (LBA) | 53 OnTrack DM6 Aux | a5 FreeBSD         | eb BeOS fs         |
| 0f W95 Ext'd (LBA) | 54 OnTrackDM6      | a6 OpenBSD         | ee GPT             |
| 10 OPUS            | 55 EZ-Drive        | a7 NeXTSTEP        | ef EFI (FAT-12/16/ |
| 11 Hidden FAT12    | 56 Golden Bow      | a8 Darwin UFS      | f0 Linux/PA-RISC b |
| 12 Compaq diagnost | 5c Priam Edisk     | a9 NetBSD          | f1 SpeedStor       |
| 14 Hidden FAT16 <3 | 61 SpeedStor       | ab Darwin boot     | f4 SpeedStor       |
| 16 Hidden FAT16    | 63 GNU HURD or Sys | af HFS / HFS+      | f2 DOS secondary   |
| 17 Hidden HPFS/NTF | 64 Novell Netware  | b7 BSDI fs         | fb VMWare VMFS     |
| 18 AST SmartSleep  | 65 Novell Netware  | b8 BSDI swap       | fc VMWare VMKCORE  |
| 1b Hidden W95 FAT3 | 70 DiskSecure Mult | bb Boot Wizard hid | fd Linux raid auto |
| 1c Hidden W95 FAT3 | 75 PC/IX           | bc Acronis FAT32 L | fe LANstep         |
| 1e Hidden W95 FAT1 | 80 Old Minix       | be Solaris boot    | ff BBT             |

  
Aliases:  
linux - 83  
swap - 82  
extended - 05  
uefi - EF  
raid - FD  
lvm - 8E  
linuxex - 85  
Hex code or alias (type L to list all): 8e  
Changed type of partition 'Linux' to 'Linux LVM'.  
Command (m for help): w  
The partition table has been altered.  
Calling ioctl() to re-read partition table.  
Syncing disks.  
[root@localhost ~]# partprobe /dev/sdb  
[root@localhost ~]#
```

Рис. 3.7: обновление таблицы разделов

Дальше я указал его как физический том LVM используя команду pvcreate (рис. 3.8).

```
pvcreate /dev/sdb1
```

```
root@localhost:~  
Hex code or alias (type L to list all): L  
00 Empty                24 NEC DOS              81 Minix / old Lin    bf Solaris  
01 FAT12                27 Hidden NTFS Win     82 Linux swap / So    c1 DRDOS/sec (FAT-  
02 XENIX root           39 Plan 9              83 Linux               c4 DRDOS/sec (FAT-  
03 XENIX usr            3c PartitionMagic      84 OS/2 hidden or     c6 DRDOS/sec (FAT-  
04 FAT16 <32M          40 Venix 80286         85 Linux extended     c7 Syrix  
05 Extended             41 PPC PReP Boot       86 NTFS volume set    da Non-FS data  
06 FAT16               42 SFS                 87 NTFS volume set    db CP/M / CTOS / .  
07 HPFS/NTFS/exFAT     4d QNX4.x              88 Linux plaintext    de Dell Utility  
08 AIX                  4e QNX4.x 2nd part     8e Linux LVM          df BootIt  
09 AIX bootable        4f QNX4.x 3rd part     93 Amoeba             e1 DOS access  
0a OS/2 Boot Manag     50 OnTrack DM          94 Amoeba BBT          e3 DOS R/O  
0b W95 FAT32           51 OnTrack DM6 Aux     9f BSD/OS             e4 SpeedStor  
0c W95 FAT32 (LBA)     52 CP/M               a0 IBM Thinkpad hi    ea Linux extended  
0e W95 FAT16 (LBA)     53 OnTrack DM6 Aux     a5 FreeBSD            eb BeOS fs  
0f W95 Ext'd (LBA)     54 OnTrackDM6          a6 OpenBSD            ee GPT  
10 OPUS                55 EZ-Drive           a7 NeXTSTEP           ef EFI (FAT-12/16/  
11 Hidden FAT12        56 Golden Bow         a8 Darwin UFS         f0 Linux/PA-RISC b  
12 Compaq diagnost    5c Priam Edisk         a9 NetBSD             f1 SpeedStor  
14 Hidden FAT16 <3    61 SpeedStor          ab Darwin boot        f4 SpeedStor  
16 Hidden FAT16        63 GNU HURD or Sys     af HFS / HFS+         f2 DOS secondary  
17 Hidden HPFS/NTF     64 Novell Netware      b7 BSDI fs            fb VMware VMFS  
18 AST SmartSleep     65 Novell Netware      b8 BSDI swap          fc VMware VMKCORE  
1b Hidden W95 FAT3     70 DiskSecure Mult    bb Boot Wizard hid    fd Linux raid auto  
1c Hidden W95 FAT3     75 PC/IX              bc Acronis FAT32 L    fe LANstep  
1e Hidden W95 FAT1     80 Old Minix          be Solaris boot       ff BBT  
  
Aliases:  
linux      - 83  
swap       - 82  
extended   - 05  
uefi       - EF  
raid       - FD  
lvm        - 8E  
linuxex    - 85  
  
Hex code or alias (type L to list all): 8e  
Changed type of partition 'Linux' to 'Linux LVM'.  
  
Command (m for help): w  
The partition table has been altered.  
Calling ioctl() to re-read partition table.  
Syncing disks.  
  
[root@localhost ~]# partprobe /dev/sdb  
[root@localhost ~]# pvcreate /dev/sdb1  
Physical volume "/dev/sdb1" successfully created.  
[root@localhost ~]#
```

Рис. 3.8: физический том LVM

Потом я убедился что физический том создан успешно с помощью команды pvs (рис. 3.9).

```

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

Aliases:
linux      - 83
swap      - 82
extended   - 05
uefi      - EF
raid       - FD
lvm        - 8E
linuxex    - 85

Hex code or alias (type L to list all): 8e
Changed type of partition 'Linux' to 'Linux LVM'.

Command (m for help): w
The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.

[root@localhost ~]# partprobe /dev/sdb
[root@localhost ~]# pvcreate /dev/sdb1
Physical volume "/dev/sdb1" successfully created.
[root@localhost ~]# pvs
PV          VG Fmt Attr PSize  PFree
/dev/sda2   rl  lvm2 a--  <99.00g  0
/dev/sdb1   lvm2 ---  100.00m 100.00m
[root@localhost ~]#

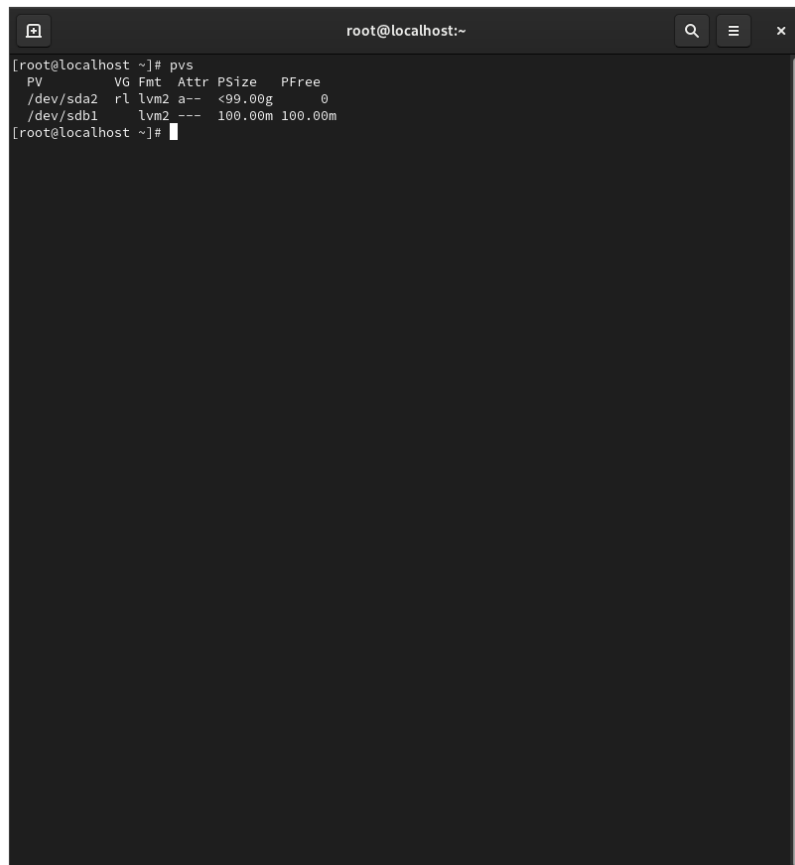
```

Рис. 3.9: проверка создания физического тома

3.2 Создание группы томов и логических томов

Сначала я проверил доступность физическиз томов в моей системе (рис. 3.10).

pvs

A terminal window titled 'root@localhost:~' with search, menu, and close icons in the title bar. The terminal shows the command 'pvs' being executed, which displays a table of physical volumes. The table has columns: PV, VG, Fmt, Attr, PSize, and PFree. The data rows are: /dev/sda2 (lvm2, a--), <99.00g, 0; and /dev/sdb1 (lvm2, ---), 100.00m, 100.00m. The prompt '[root@localhost ~]#' is visible at the bottom.

```
[root@localhost ~]# pvs
PV          VG Fmt Attr PSize  PFree
/dev/sda2   rl  lvm2 a--  <99.00g    0
/dev/sdb1   lvm2 ---  100.00m 100.00m
[root@localhost ~]#
```

Рис. 3.10: проверка доступности физическиз томов

Потом я создал группу томов с присвоенным ей физическим томом (рис. 3.11).

```
vgcreate vgdata /dev/sdb1
```

A terminal window titled 'root@localhost:~' with search, menu, and close icons in the title bar. The terminal shows the output of the 'pvs' command, which lists physical volumes. Then, the 'vgcreate vgdata /dev/sdb1' command is executed, resulting in the message 'Volume group "vgdata" successfully created'.

```
[root@localhost ~]# pvs
PV          VG Fmt Attr PSize  PFree
/dev/sda2   rl  lvm2 a--  <99.00g  0
/dev/sdb1   lvm2 ---  100.00m 100.00m
[root@localhost ~]# vgcreate vgdata /dev/sdb1
Volume group "vgdata" successfully created
[root@localhost ~]#
```

Рис. 3.11: создание грппы томов

Дальше я убедился что группа томов была создана успешно (рис. 3.12).

vgs

pvs

```
root@localhost:~  
[root@localhost ~]# pvs  
PV          VG Fmt Attr PSize  PFree  
/dev/sda2   r1  lvm2 a--  <99.00g  0  
/dev/sdb1   lvm2 ---  100.00m 100.00m  
[root@localhost ~]# vgcreate vgdata /dev/sdb1  
Volume group "vgdata" successfully created  
[root@localhost ~]# vgs  
VG          #PV #LV #SN Attr   VSize  VFree  
r1           1  3  0 wz--n-  <99.00g  0  
vgdata       1  0  0 wz--n-   96.00m 96.00m  
[root@localhost ~]# pvs  
PV          VG Fmt Attr PSize  PFree  
/dev/sda2   r1  lvm2 a--  <99.00g  0  
/dev/sdb1   vgdata lvm2 a--   96.00m 96.00m  
[root@localhost ~]#
```

Рис. 3.12: проверка успеха создания группы томов

Потом я создал логический том LVM с именем `lvdata` , который будет использо-
вать 50% доступного дискового пространства в грппу томов `vgdata` (рис. 3.13).

```
lvcreate -n lvdata -l 50%FREE vgdata
```

```
root@localhost:~  
[root@localhost ~]# pvs  
PV          VG Fmt Attr PSize  PFree  
/dev/sda2   r1  lvm2 a--  <99.00g  0  
/dev/sdb1   lvm2 ---  100.00m 100.00m  
[root@localhost ~]# vgcreate vgdata /dev/sdb1  
Volume group "vgdata" successfully created  
[root@localhost ~]# vgs  
VG          #PV #LV #SN Attr   VSize  VFree  
r1           1  3  0 wz--n-  <99.00g  0  
vgdata       1  0  0 wz--n-   96.00m 96.00m  
[root@localhost ~]# pvs  
PV          VG Fmt Attr PSize  PFree  
/dev/sda2   r1  lvm2 a--  <99.00g  0  
/dev/sdb1   vgdata lvm2 a--   96.00m 96.00m  
[root@localhost ~]# lvcreate -n lvdata -l 50%FREE vgdata  
Logical volume "lvdata" created.  
[root@localhost ~]#
```

Рис. 3.13: создание новой группы томов lvdata использующей 50% диска

Дальше проверил успешное добавление тома (рис. 3.14).

lvs

```
root@localhost:~  
[root@localhost ~]# pvs  
PV          VG Fmt Attr PSize  PFree  
/dev/sda2   rl  lvm2 a--  <99.00g  0  
/dev/sdb1   lvm2 ---  100.00m 100.00m  
[root@localhost ~]# vgcreate vgdata /dev/sdb1  
Volume group "vgdata" successfully created  
[root@localhost ~]# vgs  
VG      #PV #LV #SN Attr   VSize  VFree  
rl      1  3  0  wz--n- <99.00g  0  
vgdata  1  0  0  wz--n- 96.00m 96.00m  
[root@localhost ~]# pvs  
PV          VG Fmt Attr PSize  PFree  
/dev/sda2   rl  lvm2 a--  <99.00g  0  
/dev/sdb1   vgdata lvm2 a--  96.00m 96.00m  
[root@localhost ~]# lvcreate -n lvdata -l 50%FREE vgdata  
Logical volume "lvdata" created.  
[root@localhost ~]# lvs  
LV      VG      Attr      LSize  Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert  
home    rl      -wi-ao---- 29.89g  
root    rl      -wi-ao---- 61.23g  
swap    rl      -wi-ao---- 7.87g  
lvdata  vgdata -wi-a----- 48.00m  
[root@localhost ~]#
```

Рис. 3.14: проверка создания новой группы томов

Затем я создал файловую систему поверх логического тома (рис. 3.15).

```
mkfs.ext4 /dev/vgdata/lvdata
```

```
root@localhost:~  
[root@localhost ~]# pvs  
PV          VG Fmt Attr PSize  PFree  
/dev/sda2   rl  lvm2 a--  <99.00g  0  
/dev/sdb1   lvm2 ---  100.00m 100.00m  
[root@localhost ~]# vgcreate vgdata /dev/sdb1  
Volume group "vgdata" successfully created  
[root@localhost ~]# vgs  
VG      #PV #LV #SN Attr   VSize  VFree  
rl      1  3  0 wz--n- <99.00g  0  
vgdata  1  0  0 wz--n- 96.00m 96.00m  
[root@localhost ~]# pvs  
PV          VG Fmt Attr PSize  PFree  
/dev/sda2   rl  lvm2 a--  <99.00g  0  
/dev/sdb1   vgdata lvm2 a--  96.00m 96.00m  
[root@localhost ~]# lvcreate -n lvdata -l 50%FREE vgdata  
Logical volume "lvdata" created.  
[root@localhost ~]# lvs  
LV      VG      Attr      LSize  Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert  
home    rl      -wi-ao---- 29.89g  
root    rl      -wi-ao---- 61.23g  
swap    rl      -wi-ao---- 7.87g  
lvdata  vgdata -wi-a----- 48.00m  
[root@localhost ~]# mkfs.ext4 /dev/vgdata/lvdata  
mke2fs 1.46.5 (30-Dec-2021)  
Creating filesystem with 49152 1k blocks and 12288 inodes  
Filesystem UUID: ae6468ae-d1d2-49dd-a439-d26d7e7dce07  
Superblock backups stored on blocks:  
8193, 24577, 40961  
  
Allocating group tables: done  
Writing inode tables: done  
Creating journal (4096 blocks): done  
Writing superblocks and filesystem accounting information: done  
[root@localhost ~]#
```

Рис. 3.15: создание файловой системы

Потом я создал папку, в которой я смог смонтировать том (рис. 3.16).

```
mkdir -p /mnt/data
```

```
root@localhost:~  
[root@localhost ~]# pvs  
PV          VG Fmt Attr PSize  PFree  
/dev/sda2   rl  lvm2 a--  <99.00g  0  
/dev/sdb1    lvm2 ---  100.00m 100.00m  
[root@localhost ~]# vgcreate vgdata /dev/sdb1  
Volume group "vgdata" successfully created  
[root@localhost ~]# vgs  
VG      #PV #LV #SN Attr   VSize  VFree  
rl       1  3  0 wz--n- <99.00g  0  
vgdata   1  0  0 wz--n- 96.00m 96.00m  
[root@localhost ~]# pvs  
PV          VG Fmt Attr PSize  PFree  
/dev/sda2   rl  lvm2 a--  <99.00g  0  
/dev/sdb1   vgdata lvm2 a--  96.00m 96.00m  
[root@localhost ~]# lvcreate -n lvdata -l 50%FREE vgdata  
Logical volume "lvdata" created.  
[root@localhost ~]# lvs  
LV      VG      Attr      LSize  Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert  
home    rl      -wi-ao---- 29.89g  
root    rl      -wi-ao---- 61.23g  
swap    rl      -wi-ao---- 7.87g  
lvdata  vgdata -wi-a----- 48.00m  
[root@localhost ~]# mkfs.ext4 /dev/vgdata/lvdata  
mke2fs 1.46.5 (30-Dec-2021)  
Creating filesystem with 49152 1k blocks and 12288 inodes  
Filesystem UUID: ae6468ae-d1d2-49dd-a439-d26d7e7dce07  
Superblock backups stored on blocks:  
8193, 24577, 40961  
  
Allocating group tables: done  
Writing inode tables: done  
Creating journal (4096 blocks): done  
Writing superblocks and filesystem accounting information: done  
  
[root@localhost ~]# mkdir -p /mnt/data  
[root@localhost ~]#
```

Рис. 3.16: создание папки для монтирования тома

Дальше я добавил строку в файл /etc/fstab (рис. 3.17).

```
vim /etc/fstab  
  
a  
  
/dev/vgdata/lvdata /mnt/data ext4 defaults 1 2  
  
:wq
```



```
root@localhost:~  
[root@localhost ~]# pvs  
PV          VG Fmt Attr PSize  PFree  
/dev/sda2   rl  lvm2 a--  <99.00g  0  
/dev/sdb1   lvm2 ---  100.00m 100.00m  
[root@localhost ~]# vgcreate vgdata /dev/sdb1  
Volume group "vgdata" successfully created  
[root@localhost ~]# vgs  
VG      #PV #LV #SN Attr   VSize  VFree  
rl      1  3  0  wz--n- <99.00g  0  
vgdata  1  0  0  wz--n- 96.00m 96.00m  
[root@localhost ~]# pvs  
PV          VG Fmt Attr PSize  PFree  
/dev/sda2   rl  lvm2 a--  <99.00g  0  
/dev/sdb1   vgdata lvm2 a--  96.00m 96.00m  
[root@localhost ~]# lvcreate -n lvdata -l 50%FREE vgdata  
Logical volume "lvdata" created.  
[root@localhost ~]# lvs  
LV      VG      Attr      LSize  Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert  
home    rl      -wi-ao---- 29.89g  
root    rl      -wi-ao---- 61.23g  
swap    rl      -wi-ao---- 7.87g  
lvdata  vgdata  -wi-a----- 48.00m  
[root@localhost ~]# mkfs.ext4 /dev/vgdata/lvdata  
mkfs2fs 1.46.5 (30-Dec-2021)  
Creating filesystem with 49152 1k blocks and 12288 inodes  
Filesystem UUID: ae6468ae-d1d2-49dd-a439-d26d7e7dce07  
Superblock backups stored on blocks:  
8193, 24577, 40961  
  
Allocating group tables: done  
Writing inode tables: done  
Creating journal (4096 blocks): done  
Writing superblocks and filesystem accounting information: done  
  
[root@localhost ~]# mkdir -p /mnt/data  
[root@localhost ~]# vim /etc/fstab  
[root@localhost ~]# mount -a  
mount: (hint) your fstab has been modified, but systemd still uses  
the old version; use 'systemctl daemon-reload' to reload.  
[root@localhost ~]# systemctl daemon-reload  
[root@localhost ~]# mount -a  
[root@localhost ~]# mount | grep /mnt  
/dev/mapper/vgdata-lvdata on /mnt/data type ext4 (rw,relatime,seclabel)  
[root@localhost ~]#
```

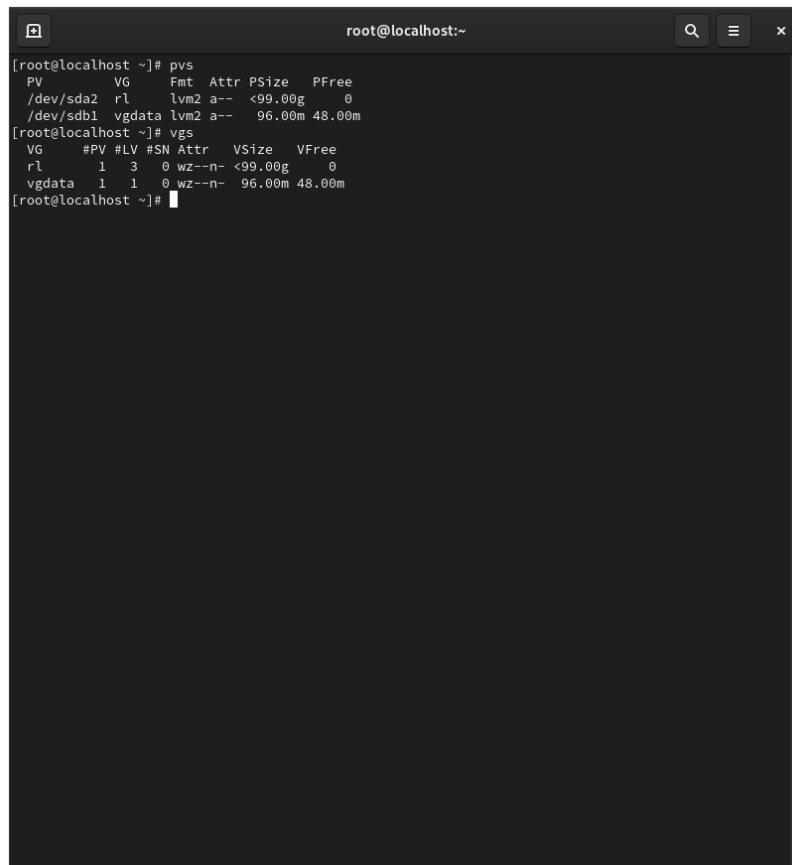
Рис. 3.18: монтирование и проверка файловой системы

3.3 Изменение размера логических томов

Сначала я посмотрел текущую конфигурацию тома и файловой системы (рис. 3.19).

pvs

vgs

A terminal window titled 'root@localhost:~' with search and window control icons. It displays the output of 'pvs' and 'vgs' commands. The 'pvs' command shows two physical volumes: /dev/sda2 (99.00g) and /dev/sdb1 (96.00m). The 'vgs' command shows two volume groups: r1 (99.00g) and vgdata (96.00m).

```
[root@localhost ~]# pvs
PV          VG      Fmt  Attr  PSize  PFree
/dev/sda2   r1       lvm2 a--  <99.00g  0
/dev/sdb1   vgdata   lvm2 a--   96.00m 48.00m
[root@localhost ~]# vgs
VG      #PV #LV #SN Attr   VSize  VFree
r1       1   3   0 wz--n- <99.00g  0
vgdata   1   1   0 wz--n-  96.00m 48.00m
[root@localhost ~]#
```

Рис. 3.19: проверка конфигурации тома

Потом с помощью `fdisk` я добавил раздел `/dev/sdb2` с размером 100М и с типом раздела 8e (рис. 3.20).

```
fdisk
e
ENTER
+100Mib
t
ENTER
8e
w
```

```
root@localhost:~  
[root@localhost ~]# fdisk /dev/sdb  
Welcome to fdisk (util-linux 2.37.4).  
Changes will remain in memory only, until you decide to write them.  
Be careful before using the write command.  
  
This disk is currently in use - repartitioning is probably a bad idea.  
It's recommended to umount all file systems, and swapoff all swap  
partitions on this disk.  
  
Command (m for help): n  
Partition type  
   p   primary (1 primary, 0 extended, 3 free)  
   e   extended (container for logical partitions)  
Select (default p): e  
Partition number (2-4, default 2):  
First sector (206848-1048575, default 206848):  
Last sector, +/-sectors or +/-size{K,M,G,T,P} (206848-1048575, default 1048575): +100MiB  
  
Created a new partition 2 of type 'Extended' and of size 100 MiB.  
  
Command (m for help): t  
Partition number (1,2, default 2):  
Hex code or alias (type L to list all): 8e  
  
Changed type of partition 'Extended' to 'Linux LVM'.  
  
Command (m for help): w  
The partition table has been altered.  
Syncing disks.  
[root@localhost ~]#
```

Рис. 3.20: добавление нового раздела

Потом я создал vgdata (рис. 3.21).

```
pvccreate /dev/sdb2
```

```
root@localhost:~  
[root@localhost ~]# fdisk /dev/sdb  
Welcome to fdisk (util-linux 2.37.4).  
Changes will remain in memory only, until you decide to write them.  
Be careful before using the write command.  
  
This disk is currently in use - repartitioning is probably a bad idea.  
It's recommended to umount all file systems, and swapoff all swap  
partitions on this disk.  
  
Command (m for help): n  
Partition type  
  p   primary (1 primary, 0 extended, 3 free)  
  e   extended (container for logical partitions)  
Select (default p): e  
Partition number (2-4, default 2):  
First sector (206848-1048575, default 206848):  
Last sector, +/-sectors or +/-size{K,M,G,T,P} (206848-1048575, default 1048575): +100MiB  
  
Created a new partition 2 of type 'Extended' and of size 100 MiB.  
  
Command (m for help): t  
Partition number (1,2, default 2):  
Hex code or alias (type L to list all): 8e  
  
Changed type of partition 'Extended' to 'Linux LVM'.  
  
Command (m for help): w  
The partition table has been altered.  
Syncing disks.  
  
[root@localhost ~]# pvcreate /dev/sdb2  
WARNING: dos signature detected on /dev/sdb2 at offset 510. Wipe it? [y/n]: y  
Wiping dos signature on /dev/sdb2.  
Physical volume "/dev/sdb2" successfully created.  
[root@localhost ~]#
```

Рис. 3.21: создание vgdata

далее расширил vgdata и проверил (рис. 3.22).

```
vgextend vgdata /dev/sdb2  
vgs
```

```
root@localhost:~  
[root@localhost ~]# fdisk /dev/sdb  
Welcome to fdisk (util-linux 2.37.4).  
Changes will remain in memory only, until you decide to write them.  
Be careful before using the write command.  
  
This disk is currently in use - repartitioning is probably a bad idea.  
It's recommended to umount all file systems, and swapoff all swap  
partitions on this disk.  
  
Command (m for help): n  
Partition type  
  p   primary (1 primary, 0 extended, 3 free)  
  e   extended (container for logical partitions)  
Select (default p): e  
Partition number (2-4, default 2):  
First sector (206848-1048575, default 206848):  
Last sector, +/-sectors or +/-size{K,M,G,T,P} (206848-1048575, default 1048575): +100Mib  
  
Created a new partition 2 of type 'Extended' and of size 100 MiB.  
  
Command (m for help): t  
Partition number (1,2, default 2):  
Hex code or alias (type L to list all): 8e  
  
Changed type of partition 'Extended' to 'Linux LVM'.  
  
Command (m for help): w  
The partition table has been altered.  
Syncing disks.  
  
[root@localhost ~]# pvcreate /dev/sdb2  
WARNING: dos signature detected on /dev/sdb2 at offset 510. Wipe it? [y/n]: y  
Wiping dos signature on /dev/sdb2.  
Physical volume "/dev/sdb2" successfully created.  
[root@localhost ~]# vgs  
VG      #PV #LV #SN Attr   VSize  VFree  
rl      1  3  0 wz--n- <99.00g  0  
vgdata  1  1  0 wz--n- 96.00m 48.00m  
[root@localhost ~]#
```

Рис. 3.22: расширение vgdata

Потом я проверил текущий размер логического тома (рис. 3.23).

lvs

```
root@localhost:~  
[root@localhost ~]# fdisk /dev/sdb  
Welcome to fdisk (util-linux 2.37.4).  
Changes will remain in memory only, until you decide to write them.  
Be careful before using the write command.  
  
This disk is currently in use - repartitioning is probably a bad idea.  
It's recommended to umount all file systems, and swapoff all swap  
partitions on this disk.  
  
Command (m for help): n  
Partition type  
   p   primary (1 primary, 0 extended, 3 free)  
   e   extended (container for logical partitions)  
Select (default p): e  
Partition number (2-4, default 2):  
First sector (206848-1048575, default 206848):  
Last sector, +/-sectors or +/-size{K,M,G,T,P} (206848-1048575, default 1048575): +100Mib  
  
Created a new partition 2 of type 'Extended' and of size 100 MiB.  
  
Command (m for help): t  
Partition number (1,2, default 2):  
Hex code or alias (type L to list all): 8e  
  
Changed type of partition 'Extended' to 'Linux LVM'.  
  
Command (m for help): w  
The partition table has been altered.  
Syncing disks.  
  
[root@localhost ~]# pvcreate /dev/sdb2  
WARNING: dos signature detected on /dev/sdb2 at offset 510. Wipe it? [y/n]: y  
Wiping dos signature on /dev/sdb2.  
Physical volume "/dev/sdb2" successfully created.  
[root@localhost ~]# vgs  
VG      #PV #LV #SN Attr   VSize  VFree  
rl      1  3  0 wz--n- <99.00g  0  
vgdata  1  1  0 wz--n- 96.00m 48.00m  
[root@localhost ~]# lvs  
LV      VG      Attr   LSize  Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert  
home    rl      -wi-ao---- 29.89g  
root    rl      -wi-ao---- 61.23g  
swap    rl      -wi-a----- 7.87g  
lvdata  vgdata  -wi-ao---- 48.00m  
[root@localhost ~]#
```

Рис. 3.23: проверка текущего размера логического тома

Дальше я проверил текущий размер файловой системы на lvdata (рис. 3.24).

df -h

```
root@localhost:~  
Command (m for help): n  
Partition type  
  p   primary (1 primary, 0 extended, 3 free)  
  e   extended (container for logical partitions)  
Select (default p): e  
Partition number (2-4, default 2):  
First sector (206848-1048575, default 206848):  
Last sector, +/-sectors or +/-size(K,M,G,T,P) (206848-1048575, default 1048575): +100Mib  
  
Created a new partition 2 of type 'Extended' and of size 100 MiB.  
  
Command (m for help): t  
Partition number (1,2, default 2):  
Hex code or alias (type L to list all): 8e  
  
Changed type of partition 'Extended' to 'Linux LVM'.  
  
Command (m for help): w  
The partition table has been altered.  
Syncing disks.  
  
[root@localhost ~]# pvcreate /dev/sdb2  
WARNING: dos signature detected on /dev/sdb2 at offset 510. Wipe it? [y/n]: y  
Wiping dos signature on /dev/sdb2.  
Physical volume "/dev/sdb2" successfully created.  
[root@localhost ~]# vgs  
VG      #PV #LV #SN Attr   VSize   VFree  
rl      1  3  0 wz--n- <99.00g  0  
vgdata  1  1  0 wz--n- 96.00m 48.00m  
[root@localhost ~]# lvs  
LV      VG      Attr   LSize   Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert  
home    rl      -wi-ao---- 29.89g  
root    rl      -wi-ao---- 61.23g  
swap    rl      -wi-a----- 7.87g  
lvdata  vgdata  -wi-ao---- 48.00m  
[root@localhost ~]# df -h  
Filesystem      Size  Used Avail Use% Mounted on  
devtmpfs        4.0M  0  4.0M  0% /dev  
tmpfs           7.7G  0  7.7G  0% /dev/shm  
tmpfs           3.1G  9.3M  3.1G  1% /run  
/dev/mapper/rl-root 62G  5.3G  56G  9% /  
/dev/sda1       960M  457M  504M  48% /boot  
/dev/mapper/rl-home 30G   17G   14G  56% /home  
tmpfs           1.6G  892K  1.6G  1% /run/user/1000  
/dev/sr0        51M   51M   0 100% /run/media/qjarishekk/VBox_GAs_7.0.18  
/dev/mapper/vgdata-lvdata 40M   14K   37M  1% /mnt/data  
[root@localhost ~]#
```

Рис. 3.24: текущий размер системы на lvdata

Потом я убедился что lvdata на 50% оставшегося доступного дискового пространства в группе томов (рис. 3.25).

```
lvextend -r -l +50%FREE /dev/vgdata/lvdata
```

```
root@localhost:~  
Hex code or alias (type L to list all): 8e  
Changed type of partition 'Extended' to 'Linux LVM'.  
Command (m for help): w  
The partition table has been altered.  
Syncing disks.  
[root@localhost ~]# pvcreate /dev/sdb2  
WARNING: dos signature detected on /dev/sdb2 at offset 510. Wipe it? [y/n]: y  
Wiping dos signature on /dev/sdb2.  
Physical volume "/dev/sdb2" successfully created.  
[root@localhost ~]# vgs  
VG      #PV #LV #SN Attr   VSize  VFree  
rl      1  3  0 wz--n- <99.00g  0  
vgdata  1  1  0 wz--n- 96.00m 48.00m  
[root@localhost ~]# lvs  
LV      VG      Attr   LSize  Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert  
home    rl      -wi-ao---- 29.89g  
root    rl      -wi-ao---- 61.23g  
swap    rl      -wi-a----- 7.87g  
lvdata  vgdata -wi-ao---- 48.00m  
[root@localhost ~]# df -h  
Filesystem      Size  Used Avail Use% Mounted on  
devtmpfs        4.0M  0  4.0M  0% /dev  
tmpfs           7.7G  0  7.7G  0% /dev/shm  
tmpfs           3.1G  9.3M  3.1G  1% /run  
/dev/mapper/rl-root 62G  5.3G  56G  9% /  
/dev/sda1       960M  457M  504M  48% /boot  
/dev/mapper/rl-home 30G  17G  14G  56% /home  
tmpfs           1.6G  892K  1.6G  1% /run/user/1000  
/dev/sr0        51M   51M   0 100% /run/media/qjarishekk/VBox_GAs_7.0.18  
/dev/mapper/vgdata-lvdata 40M  14K  37M  1% /mnt/data  
[root@localhost ~]# lvextend -r -l +50%FREE /dev/vgdata/lvdata  
Size of logical volume vgdata/lvdata changed from 48.00 MiB (12 extents) to 72.00 MiB (18 extents).  
File system ext4 found on vgdata/lvdata mounted at /mnt/data.  
Extending file system ext4 to 72.00 MiB (75497472 bytes) on vgdata/lvdata...  
resize2fs /dev/vgdata/lvdata  
resize2fs 1.46.5 (30-Dec-2021)  
Filesystem at /dev/vgdata/lvdata is mounted on /mnt/data; on-line resizing required  
old_desc_blocks = 1, new_desc_blocks = 1  
The filesystem on /dev/vgdata/lvdata is now 73728 (1k) blocks long.  
resize2fs done  
Extended file system ext4 on vgdata/lvdata.  
Logical volume vgdata/lvdata successfully resized.  
[root@localhost ~]#
```

Рис. 3.25: проверка lvdata

Затем я убедился что добавление дискового пространства стало доступным (рис. 3.26).

```
lvs  
df -h
```



```
root@localhost:~  
LV VG Attr LSize Pool Origin Data% Meta% Move Log Cpy%Sync Convert  
home rl -wi-ao---- 29.89g  
root rl -wi-ao---- 61.23g  
swap rl -wi-a----- 7.87g  
lvdata vgdata -wi-ao---- 48.00m  
[root@localhost ~]# df -h  
Filesystem Size Used Avail Use% Mounted on  
devtmpfs 4.0M 0 4.0M 0% /dev  
tmpfs 7.7G 0 7.7G 0% /dev/shm  
tmpfs 3.1G 9.3M 3.1G 1% /run  
/dev/mapper/rl-root 62G 5.3G 56G 9% /  
/dev/sda1 960M 457M 504M 48% /boot  
/dev/mapper/rl-home 30G 17G 14G 56% /home  
tmpfs 1.6G 892K 1.6G 1% /run/user/1000  
/dev/sr0 51M 51M 0 100% /run/media/qjarishekk/VBox_GAs_7.0.18  
/dev/mapper/vgdata-lvdata 40M 14K 37M 1% /mnt/data  
[root@localhost ~]# lvextend -r -l +50%FREE /dev/vgdata/lvdata  
Size of logical volume vgdata/lvdata changed from 48.00 MiB (12 extents)  
to 72.00 MiB (18 extents).  
File system ext4 found on vgdata/lvdata mounted at /mnt/data.  
Extending file system ext4 to 72.00 MiB (75497472 bytes) on vgdata/lvdata...  
resize2fs /dev/vgdata/lvdata  
resize2fs 1.46.5 (30-Dec-2021)  
Filesystem at /dev/vgdata/lvdata is mounted on /mnt/data; on-line resizing required  
old_desc_blocks = 1, new_desc_blocks = 1  
The filesystem on /dev/vgdata/lvdata is now 73728 (1k) blocks long.  
  
resize2fs done  
Extended file system ext4 on vgdata/lvdata.  
Logical volume vgdata/lvdata successfully resized.  
[root@localhost ~]# lvs  
LV VG Attr LSize Pool Origin Data% Meta% Move Log Cpy%Sync Convert  
home rl -wi-ao---- 29.89g  
root rl -wi-ao---- 61.23g  
swap rl -wi-a----- 7.87g  
lvdata vgdata -wi-ao---- 72.00m  
[root@localhost ~]# df -h  
Filesystem Size Used Avail Use% Mounted on  
devtmpfs 4.0M 0 4.0M 0% /dev  
tmpfs 7.7G 0 7.7G 0% /dev/shm  
tmpfs 3.1G 9.3M 3.1G 1% /run  
/dev/mapper/rl-root 62G 5.3G 56G 9% /  
/dev/sda1 960M 457M 504M 48% /boot  
/dev/mapper/rl-home 30G 17G 14G 56% /home  
tmpfs 1.6G 892K 1.6G 1% /run/user/1000  
/dev/sr0 51M 51M 0 100% /run/media/qjarishekk/VBox_GAs_7.0.18  
/dev/mapper/vgdata-lvdata 63M 14K 58M 1% /mnt/data  
[root@localhost ~]#
```

Рис. 3.26: проверка добавления дискового пространства

Дальше я уменьшил размер lvdata на 50МБ (рис. 3.27).

```
lvreduce -r -L -50M /dev/vgdata/lvdata
```

```
root@localhost:~  
resize2fs done  
Extended file system ext4 on vgdata/lvdata.  
Logical volume vgdata/lvdata successfully resized.  
[root@localhost ~]# lvs  
LV      VG      Attr      LSize   Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert  
home    rl      -wi-ao---- 29.89g  
root    rl      -wi-ao---- 61.23g  
swap    rl      -wi-a----- 7.87g  
lvdata  vgdata  -wi-ao---- 72.00m  
[root@localhost ~]# df -h  
Filesystem      Size  Used Avail Use% Mounted on  
devtmpfs         4.0M   0   4.0M   0% /dev  
tmpfs            7.7G   0   7.7G   0% /dev/shm  
tmpfs           3.1G  9.3M  3.1G   1% /run  
/dev/mapper/rl-root 62G  5.3G  56G   9% /  
/dev/sda1       960M  457M  504M  48% /boot  
/dev/mapper/rl-home 30G   17G   14G  56% /home  
tmpfs           1.6G  892K  1.6G   1% /run/user/1000  
/dev/sr0        51M   51M    0 100% /run/media/qjarishekk/VBox_GAs_7.0.18  
/dev/mapper/vgdata-lvdata 63M  14K   58M   1% /mnt/data  
[root@localhost ~]# lvreduce -r -L -50M /dev/vgdata/lvdata  
Rounding size to boundary between physical extents: 48.00 MiB.  
File system ext4 found on vgdata/lvdata mounted at /mnt/data.  
File system size (72.00 MiB) is larger than the requested size (24.00 MiB).  
File system reduce is required using resize2fs.  
File system unmount is needed for reduce.  
File system fsck will be run before reduce.  
Continue with ext4 file system reduce steps: unmount, fsck, resize2fs? [y/n]:y  
Reducing file system ext4 to 24.00 MiB (25165824 bytes) on vgdata/lvdata...  
unmount /mnt/data  
unmount done  
e2fsck /dev/vgdata/lvdata  
/dev/vgdata/lvdata: 11/18432 files (0.0% non-contiguous), 10027/73728 blocks  
e2fsck done  
resize2fs /dev/vgdata/lvdata 24576k  
resize2fs 1.46.5 (30-Dec-2021)  
Resizing the filesystem on /dev/vgdata/lvdata to 24576 (1k) blocks.  
The filesystem on /dev/vgdata/lvdata is now 24576 (1k) blocks long.  
  
resize2fs done  
remount /dev/vgdata/lvdata /mnt/data  
remount done  
Reduced file system ext4 on vgdata/lvdata.  
Size of logical volume vgdata/lvdata changed from 72.00 MiB (18 extents) to 24.00 MiB (6 extents).  
Logical volume vgdata/lvdata successfully resized.  
[root@localhost ~]#
```

Рис. 3.27: уменьшение размера lvdata

в конце концов я проверил все (рис. 3.28).

lvs

df -h

```
root@localhost:~  
/dev/mapper/rl-home      30G   17G   14G   56% /home  
tmpfs                   1.6G 892K 1.6G   1% /run/user/1000  
/dev/sr0                 51M   51M    0 100% /run/media/qjarishekk/VBox_GAs_7.0.18  
/dev/mapper/vgdata-lvdata 63M  14K   58M   1% /mnt/data  
[root@localhost ~]# lvreduce -r -L 50M /dev/vgdata/lvdata  
Rounding size to boundary between physical extents: 48.00 MiB.  
File system ext4 found on vgdata/lvdata mounted at /mnt/data.  
File system size (72.00 MiB) is larger than the requested size (24.00 MiB).  
File system reduce is required using resize2fs.  
File system unmount is needed for reduce.  
File system fsck will be run before reduce.  
Continue with ext4 file system reduce steps: unmount, fsck, resize2fs? [y/n]:y  
Reducing file system ext4 to 24.00 MiB (25165824 bytes) on vgdata/lvdata...  
unmount /mnt/data  
unmount done  
e2fsck /dev/vgdata/lvdata  
/dev/vgdata/lvdata: 11/18432 files (0.0% non-contiguous), 10027/73728 blocks  
e2fsck done  
resize2fs /dev/vgdata/lvdata 24576k  
resize2fs 1.46.5 (30-Dec-2021)  
Resizing the filesystem on /dev/vgdata/lvdata to 24576 (1k) blocks.  
The filesystem on /dev/vgdata/lvdata is now 24576 (1k) blocks long.  
  
resize2fs done  
remount /dev/vgdata/lvdata /mnt/data  
remount done  
Reduced file system ext4 on vgdata/lvdata.  
Size of logical volume vgdata/lvdata changed from 72.00 MiB (18 extents) to 24.00 MiB (6 extents).  
Logical volume vgdata/lvdata successfully resized.  
[root@localhost ~]# lvs  
LV      VG      Attr      LSize   Pool Origin Data%  Meta%   Move Log Cpy%Sync Convert  
home    rl      -wi-ao---- 29.89g  
root    rl      -wi-ao---- 61.23g  
swap    rl      -wi-a----- 7.87g  
lvdata  vgdata  -wi-ao---- 24.00m  
[root@localhost ~]# df -h  
Filesystem      Size  Used Avail Use% Mounted on  
devtmpfs         4.0M    0  4.0M   0% /dev  
tmpfs            7.7G    0  7.7G   0% /dev/shm  
tmpfs           3.1G  9.3M  3.1G   1% /run  
/dev/mapper/rl-root 62G  5.3G  56G   9% /  
/dev/sda1       960M 457M 504M 48% /boot  
/dev/mapper/rl-home 30G  17G  14G  56% /home  
tmpfs           1.6G 892K 1.6G   1% /run/user/1000  
/dev/sr0        51M   51M    0 100% /run/media/qjarishekk/VBox_GAs_7.0.18  
/dev/mapper/vgdata-lvdata 18M  14K  17M   1% /mnt/data  
[root@localhost ~]#
```

Рис. 3.28: проверка уменьшения размера

4 Выводы

В эту лабораторную работу я смог смотреть как создать группу томов и как изменить их с помощью команд `pvs vgs lvcreate pvcreate vgextend` и т.д.

Список литературы