

Презентация лабораторной работы №15

Управление логическими томами

Кхари Жекка Кализая Арсе

Лабораторная работа

Последовательность выполнения работы

Создание физического тома

- цель: создать физического тома

- Команды:
 - `vim /etc/fstab`
 - (комментировать строку)
 - `umount /mnt/data`
 - `fdisk`
 - `o ENTER w ENTER`
 - `partprobe /dev/sdb`

удаление 파티ций

```
root@localhost:~# cat /etc/fstab
#
# /etc/fstab
# Created by anaconda on Sun Dec  8 13:20:15 2024
#
# 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.
#
# After editing this file, run 'systemctl daemon-reload' to update systemd
# units generated from this file.
#
/dev/mapper/rl-root    /                    xfs     defaults        0 0
UUID=d1e6ae9-c017-4d3f-9dd7-ce647b15ba1b /boot                xfs     defaults        0 0
/dev/mapper/rl-home    /home                xfs     defaults        0 0
/dev/mapper/rl-swap    none                 swap    defaults        0 0
UUID=17a18f71-7487-496a-baaa-0bca8d9c6758 /mnt/data            xfs     defaults 1 2
```

удаление 파티션

```
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 ~]#
```


создание физического тома

- команды:
 - `fdisk /dev/sdb`
 - `n p` (по умолчанию) `t 8e w`
 - `partprobe /dev/sdb`
 - `pvccreate /dev/sdb1`
 - `pvs`

создание физического тома

```
root@localhost:~  
Partition #1 contains a xfs signature.  
Do you want to remove the signature? [Y]es/[N]o: y  
The signature will be removed by a write command.  
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 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 OPU             | 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):
```

создание физического тома

```

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

```

Создание группы томов и логических томов

- КОМАНДЫ:
 - `vgcreate vgdata /dev/sdb1`
 - `vgs`
 - `pvs`
 - `lvcreate -n lvdata -l 50%FREE vgdata`
 - `lvs`
 - `mkfs.ext4 /dev/vgdata/lvdata`
 - `mkdir -p /mnt/data`
 - `vim /etc/fstab /dev/vgdata/lvdata /mnt/data ext4 defaults 1 2`
 - `systemctl daemon-reload`
 - `mount -a`
 - `mount`

создание группы ТОМОВ

```
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 ~]#
```

создание группы томов

```
root@localhost:~  
#  
# /etc/fstab  
# Created by anaconda on Sun Dec  8 13:20:15 2024  
#  
# 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.  
#  
# After editing this file, run 'systemctl daemon-reload' to update systemd  
# units generated from this file.  
#  
/dev/mapper/rl-root / xfs defaults 0 0  
UUID=d1e66ae9-c017-4d3f-9dd7-ce647b15ba1b /boot xfs defaults 0 0  
/dev/mapper/rl-home /home xfs defaults 0 0  
/dev/mapper/rl-swap none swap defaults 0 0  
UUID=17a18f71-7487-496a-baaa-0bca8d9c6758 /mnt/data xfs defaults 1 2  
/dev/vgdata/lvdata /mnt/data ext4 defaults 1 2  
  
-- INSERT --
```


создание группы ТОМОВ

```
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 ~]# 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 ~]#
```

Изменение размера логических томов

- Команды:
 - `pvs`
 - `vgs`
 - `fdisk /dev/sdb`
 - `p e` (по-умолчанию) `+100Mib t 8e`
 - `partprobe /dev/sdb`

создание новой партии

```
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 ~]#
```

- Команды:
 - `pvccreate /dev/sdb2`
 - `vgextend vgdata /dev/sdb2`
 - `vgs`
 - `lvs`
 - `df -h`
 - `lvextend -r -l +50%FREE /dev/vgdata/lvdata`
 - `df -h`
 - `lvreduce -r -L -50M /dev/vgdata/lvdata`
 - `lvs`
 - `df -h`

изменение размера логического тома

```
root@localhost:~  
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 ~]# 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 ~]#
```

изменение размера логического тома

```
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 ~]#
```