

Лабораторная работа 15

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Задача

1. Продемонстрировать навыки создания физических томов на LVM (см. раз- дел 15.4.1).

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3. Продемонстрировать навыки изменения размера логических томов на LVM (см. раздел 15.4.3).
4. Выполнить задание для самостоятельной работы (см. раздел 15.5)

Выполнение

Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Command (m for help): o

Created a new DOS disklabel with disk identifier 0x8a409485.

The device contains 'gpt' signature and it will be removed by a write command. See fdisk(8) man page and --wipe option for more details.

Command (m for help): w

The partition table has been altered.

Calling ioctl() to re-read partition table.

[189.151094] vdc:

Syncing disks.

[189.171273] vdc:

[root@dmgeneralov ~]#

[root@dmgeneralov ~]# partprobe /dev/vdb

[root@dmgeneralov ~]# [197.831174] vdb:

[root@dmgeneralov ~]# partprobe /dev/vdc

[201.550015] vdc:

[root@dmgeneralov ~]#

[root@dmgeneralov ~]# cat /proc/partitions

major	minor	#blocks	name
252	0	7340032	vda
252	1	1040576	vda1
252	2	6290432	vda2
252	16	262144	vdb
252	32	262144	vdc
11	0	1040575	sr0
253	0	5550000	dm-0
253	1	737200	dm-1

[root@dmgeneralov ~]# fdisk --list /dev/vdb

Disk /dev/vdb: 256 MiB, 268435456 bytes, 524288 sectors

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: 0x0d3649b9

[root@dmgeneralov ~]# fdisk --list /dev/vdc

Disk /dev/vdc: 256 MiB, 268435456 bytes, 524288 sectors

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: 0x8a409485

[root@dmgeneralov ~]#


```

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 DRBDOS/sec (FAT-
02 XENIX root            39 Plan 9                83 Linux               c4 DRBDOS/sec (FAT-
03 XENIX usr             3c PartitionMagic       84 OS/2 hidden or     c6 DRBDOS/sec (FAT-
04 FAT16 <32M            40 Unix BB286           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    dc Dell Utility
08 AIX                   4e QNX4.x 2nd part      8e Linux LUM          df BootIt
09 AIX bootable          4f QNX4.x 3rd part      93 Amocba             e1 DOS access
0a OS/2 Boot Manag       50 OnTrack DM           94 Amocba BBT         e3 DOS R/O
0b W95 FAT32             51 OnTrack DM6 Aux      9f BSD/OS             e4 SpeedStar
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 OnTrack DM6          a6 OpenBSD           ee GPT
10 OPUS                  55 EZ-Drive             a7 MeXTSTEP           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 SpeedStar
14 Hidden FAT16 <3       61 SpeedStar            ab Darwin boot        f4 SpeedStar
16 Hidden FAT16          63 GNU HURD or Sys     af HFS / HFS+         f2 DOS secondary
17 Hidden HPFS/NTF       64 Movell Netware       b7 BSDI fs            fb Unware UMF5
18 AST SmartSleep        65 Movell Netware       b8 BSDI swap          fc Unware UMMCORE
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
linuxxx    - 85

```

```

Hex code or alias (type L to list all): lvm
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.
[ 485.598846] vdb: vdb1
Syncing disks.
[ 485.618852] vdb: vdb1

```

```
[root@dmgeneralov ~]#
```

```
[root@dmgeneralov ~]# pvcreate /dev/vdb1
Physical volume "/dev/vdb1" successfully created.
[root@dmgeneralov ~]# pvs
  PV          VG Fmt  Attr PSize   PFree
  /dev/vda2   r1  lvm2 a--   <6.00g     0
  /dev/vdb1    lvm2 ---  100.00m 100.00m
[root@dmgeneralov ~]# vgcreate vgdata /dev/vdb1
Volume group "vgdata" successfully created
[root@dmgeneralov ~]# vgs
  VG          #PV #LV #SN Attr   USize   UFree
  r1           1   2   0 wz--n- <6.00g     0
  vgdata       1   0   0 wz--n- 96.00m 96.00m
[root@dmgeneralov ~]# pvs
  PV          VG      Fmt  Attr PSize   PFree
  /dev/vda2   r1      lvm2 a--   <6.00g     0
  /dev/vdb1   vgdata  lvm2 a--  96.00m 96.00m
[root@dmgeneralov ~]#
```

Рис. 3: pvcreate

```
[root@dmgeneralov ~]# lvcreate -n lvdata -l 50%FREE vgdata
Logical volume "lvdata" created.
[root@dmgeneralov ~]# lvs
  LV      VG      Attr      LSize   Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert
  root    rl      -wi-ao---- 5.29g
  swap    rl      -wi-ao---- 720.00m
  lvdata  vgdata  -wi-a----- 48.00m
[root@dmgeneralov ~]# mkfs.ext4 /dev/vgdata/lvdata
mke2fs 1.46.5 (30-Dec-2021)
Discarding device blocks: done
Creating filesystem with 49152 1k blocks and 12288 inodes
Filesystem UUID: eb1ed331-e1c5-49d0-bb55-632c375e5bce
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@dmgeneralov ~]# mkdir -p /mnt/data
[root@dmgeneralov ~]# echo "/dev/vgdata/lvdata /mnt/data ext4 defaults 1 2" >> /etc/fstab
[root@dmgeneralov ~]# mount -a
[ 804.240009] EXT4-fs (dm-2): mounted filesystem with ordered data mode. Quota mode: none.
[root@dmgeneralov ~]# mount | grep /mnt
/dev/mapper/vgdata-lvdata on /mnt/data type ext4 (rw,relatime,seclabel)
[root@dmgeneralov ~]#
```

Рис. 4: lvcreate

```

[root@dmgeneralov ~]# fdisk /dev/vdb

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 unmount 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): p
Partition number (2-4, default 2):
First sector (206848-524287, default 206848):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (206848-524287, default 524287): +100M

Created a new partition 2 of type 'Linux' and of size 100 MiB.

Command (m for help): t
Partition number (1,2, default 2): 2
Hex code or alias (type L to list all): lvm

Changed type of partition 'Linux' to 'Linux LVM'.

Command (m for help): w
The partition table has been altered.
Syncing disks.

[root@dmgeneralov ~]# pvcreate /dev/vdb2
Physical volume "/dev/vdb2" successfully created.
[root@dmgeneralov ~]# vgextend vgdata /dev/sdb2
No device found for /dev/sdb2.
[root@dmgeneralov ~]# vgextend vgdata /dev/vdb2
Volume group "vgdata" successfully extended
[root@dmgeneralov ~]# vgs
VG          #PV #LV #SN Attr   USize  UFree
rl          1   2   0 wz--n-  <6.00g    0
vgdata     2   1   0 wz--n- 192.00m 144.00m
[root@dmgeneralov ~]#

```

```

[root@dmgeneralov ~]# df -h | grep lvdata
/dev/mapper/vgdata-lvdata 48M 14K 37M 1% /mnt/data
[root@dmgeneralov ~]# lvextend -r -l +50%FREE /dev/vgdata/lvdata
Size of logical volume vgdata/lvdata changed from 48.00 MiB (12 extents) to 120.00 MiB (30 extents).
[ 1112.908613] dm-2: detected capacity change from 98304 to 245760
Logical volume vgdata/lvdata successfully resized.
resize2fs 1.46.5 (30-Dec-2021)
Filesystem at /dev/mapper/vgdata-lvdata is mounted on /mnt/data; on-line resizing required
old_desc_blocks = 1, new_desc_blocks = 1
[ 1113.838150] EXT4-fs (dm-2): resizing filesystem from 49152 to 122880 blocks
[ 1113.846604] EXT4-fs (dm-2): resized filesystem to 122880
The filesystem on /dev/mapper/vgdata-lvdata is now 122880 (1k) blocks long.

[root@dmgeneralov ~]# df -h | grep lvdata
/dev/mapper/vgdata-lvdata 107M 14K 101M 1% /mnt/data
[root@dmgeneralov ~]# lvs | grep lvdata
lvdata vgdata -wi-ao---- 120.00m
[root@dmgeneralov ~]# lvreduce -r -L -50M /dev/vgdata/lvdata
Rounding size to boundary between physical extents: 48.00 MiB.
Do you want to unmount "/mnt/data" ? [Y/n] y
fsck from util-linux 2.37.4
/dev/mapper/vgdata-lvdata: 11/38728 files (0.0% non-contiguous), 13369/122880 blocks
resize2fs 1.46.5 (30-Dec-2021)
Resizing the filesystem on /dev/mapper/vgdata-lvdata to 73728 (1k) blocks.
The filesystem on /dev/mapper/vgdata-lvdata is now 73728 (1k) blocks long.

[ 1151.091936] EXT4-fs (dm-2): mounted filesystem with ordered data mode. Quota mode: none.
Size of logical volume vgdata/lvdata changed from 120.00 MiB (30 extents) to 72.00 MiB (18 extents).
[ 1151.114506] dm-2: detected capacity change from 245760 to 147456
Logical volume vgdata/lvdata successfully resized.
[root@dmgeneralov ~]# lvs | grep lvdata
lvdata vgdata -wi-ao---- 72.00m
[root@dmgeneralov ~]# df -h | grep lvdata
/dev/mapper/vgdata-lvdata 63M 14K 58M 1% /mnt/data
[root@dmgeneralov ~]# _

```

```
[root@dmgeneralov ~]# vgs
VG      #PU #LU #SN Attr      USize  UFree
rl      1  2  0 wz--n-   <6.00g    0
vgdata  2  1  0 wz--n-  192.00m 120.00m
[root@dmgeneralov ~]# pvcreate /dev/vdc
WARNING: dos signature detected on /dev/vdc at offset 510. Wipe it? [y/n]: y
Wiping dos signature on /dev/vdc.
Physical volume "/dev/vdc" successfully created.
[root@dmgeneralov ~]# vgextend vgdata /dev/vdc
Volume group "vgdata" successfully extended
[root@dmgeneralov ~]# vgs
VG      #PU #LU #SN Attr      USize  UFree
rl      1  2  0 wz--n-   <6.00g    0
vgdata  3  1  0 wz--n-  444.00m 372.00m
[root@dmgeneralov ~]# lvcreate -n lvgroup -L 200M vgdata
Logical volume "lvgroup" created.
[root@dmgeneralov ~]# mkfs.xfs /dev/mapper/vgdata-lvgroup
meta-data=/dev/mapper/vgdata-lvgroup isize=512    agcount=4, agsize=12800 blks
       =                       sectsz=512    attr=2, projid32bit=1
       =                       crc=1          finobt=1, sparse=1, rmapbt=0
       =                       reflink=1      bigtime=1 inobtcount=1
data      =                       bsize=4096    blocks=51200, imaxpct=25
       =                       sunit=0        swidth=0 blks
naming    =version 2              bsize=4096    ascii-ci=0, ftype=1
log        =internal log          bsize=4096    blocks=1368, version=2
       =                       sectsz=512    sunit=0 blks, lazy-count=1
realtime  =none                   extsz=4096    blocks=0, rtextents=0
Discarding blocks...Done.
[root@dmgeneralov ~]# echo "/dev/mapper/vgdata-lvgroup /mnt/groups xfs defaults 1 2" >> /etc/fstab
[root@dmgeneralov ~]# mkdir -p /mnt/groups
[root@dmgeneralov ~]# mount -a
[ 1505.206893] XFS (dm-3): Mounting UFS Filesystem
[ 1505.223800] XFS (dm-3): Ending clean mount
[root@dmgeneralov ~]# mount | grep /mnt
/dev/mapper/vgdata-lvdata on /mnt/data type ext4 (rw,relatime,seclabel)
/dev/mapper/vgdata-lvgroup on /mnt/groups type xfs (rw,relatime,seclabel,attr2,inode64,logbufs=8,logbsize=32k,noquota)
[root@dmgeneralov ~]#
```

Рис. 7: lvcreate

```
Rocky Linux 9.1 (Blue Onyx)
Kernel 5.14.0-162.6.1.el9_1.0.1.x86_64 on an x86_64

dmgeneralov login: root
Password:
Last login: Fri Dec 30 13:55:28 on tty1
[root@dmgeneralov ~]# df -h | grep /mnt
/dev/mapper/vgdata-lvggroup 195M 12M 184M 6% /mnt/groups
/dev/mapper/vgdata-lvdata 63M 14K 58M 1% /mnt/data
[root@dmgeneralov ~]# ls | grep lvggroup
lvggroup vgdata -wi-ao---- 200.00m
[root@dmgeneralov ~]# vgs
VG      #PV #LU #SN Attr   USize   UFree
rl      1  2  0 wz--n-   <6.00g    0
vgdata  3  2  0 wz--n- 444.00m 172.00m
[root@dmgeneralov ~]# lvextend -L +150M -r vgdata/lvggroup
Rounding size to boundary between physical extents: 152.00 MiB.
Size of logical volume vgdata/lvggroup changed from 200.00 MiB (50 extents) to 352.00 MiB (88 extents).
[ 116.159046] dm-3: detected capacity change from 409600 to 728096
Logical volume vgdata/lvggroup successfully resized.
meta-data=/dev/mapper/vgdata-lvggroup isize=512    agcount=4, agsize=12800 blks
        =                               sectsz=512   attr=2, projid32bit=1
        =                               crc=1        finobt=1, sparse=1, rmapbt=0
        =                               reflink=1     bigtime=1 inobtcount=1
data     =                               bsize=4096   blocks=51200, imaxpct=25
        =                               sunit=0      swidth=0 blks
naming   =version 2                       bsize=4096   ascii-ci=0, ftype=1
log      =internal log                   bsize=4096   blocks=1368, version=2
        =                               sectsz=512   sunit=0 blks, lazy-count=1
realtime =none                          extsz=4096   blocks=0, rtextents=0
data blocks changed from 51200 to 90112
[root@dmgeneralov ~]# df -h | grep /mnt
/dev/mapper/vgdata-lvggroup 347M 13M 334M 4% /mnt/groups
/dev/mapper/vgdata-lvdata 63M 14K 58M 1% /mnt/data
[root@dmgeneralov ~]#
```

Рис. 8: lvextend

Я получил опыт работы с LVM в Linux.