

Лабораторная работа 14

Партиции, файловые системы, монтирование

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Цель работы

Получить навыки создания разделов, файловых систем и монтирования в Linux.

Задание

1. Добавить два диска в VirtualBox
2. Создать разделы MBR с **fdisk**
3. Создать логические разделы
4. Создать раздел подкачки
5. Создать разделы GPT с **gdisk**
6. Отформатировать XFS и EXT4
7. Смонтировать вручную и через `/etc/fstab`
8. Выполнить самостоятельное задание

Создание виртуальных носителей (2×512 MB)

 **Носители**

Контроллер: IDE
Вторичное устройство IDE 0: [Оптический привод] VBoxGuestAdditions.iso (50,68 МБ)

Контроллер: SATA

SATA порт 0:	Rocky.vdi (Обычный, 40,00 ГБ)
SATA порт 1:	disk1.vdi (Обычный, 512,00 МБ)
SATA порт 2:	disk2.vdi (Обычный, 512,00 МБ)

Информация о дисках в системе

```
Activities Terminal Sep 9 13:56 en
root@ndbaranov:~

[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# fdisk --list
Disk /dev/sda: 40 GiB, 42949672960 bytes, 83886080 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: 0xae7338c

Device Boot Start End Sectors Size Id Type
/dev/sda1 * 2048 2099199 2097152 16 83 Linux
/dev/sda2 2099200 83886079 81786880 39G 8e Linux LVM

Disk /dev/sdc: 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

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

Disk /dev/mapper/rl-root: 35.05 GiB, 37635489792 bytes, 73506816 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

Disk /dev/mapper/rl-swap: 3.95 GiB, 4236247040 bytes, 8273920 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
[root@ndbaranov ~]# 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.

Device does not contain a recognized partition table.
Created a new DOS disklabel with disk identifier 0xb5c08ea9.

Command (m for help):
```

Справка по командам fdisk

```
Activities Terminal Sep 9 13:57 en
root@ndbaranov:~

Command (m for help): m

Help:

DOS (MBR)
a toggle a bootable flag
b edit nested BSD disklabel
c toggle the dos compatibility flag

Generic
d delete a partition
l list free unpartitioned space
l list known partition types
n add a new partition
p print the partition table
t change a partition type
v verify the partition table
i print information about a partition

Misc
m print this menu
u change display/entry units
x extra functionality (experts only)

Script
I load disk layout from sfdisk script file
O dump disk layout to sfdisk script file

Save & Exit
w write table to disk and exit
q quit without saving changes

Create a new label
g create a new empty GPT partition table
G create a new empty SGI (IRIX) partition table
o create a new empty DOS partition table
s create a new empty Sun partition table

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: 0xb5c08ea9

Command (m for help):
```

Создание основного раздела (100 MB)

```
Activities Terminal Sep 9 14:00 en root@ndbaranov:~

Command (m for help): n
Partition type
  p primary (0 primary, 0 extended, 4 free)
  e extended (container for logical partitions)
Select (default p): p
Partition number (1-4, default 1): 1
First sector (2048-1048575, default 2048):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2048-1048575, default 1048575): +100M

Created a new partition 1 of type 'Linux' and of size 100 MiB.

Command (m for help): t
Selected partition 1
Hex code or alias (type L to list all):
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 Network    b7 BSDI fs           fb VMware VMFS
18 AST SmartSleep      65 Novell Network    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
Use code or alias (type L to list all):
```


Проверка и запись изменений

```
Activities Terminal Sep 9 14:03 en
root@ndbaranov:~

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): 83
Changed type of partition 'Linux' to 'Linux'.

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

[root@ndbaranov ~]# fdisk -l /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: 0xb5c08ea9

Device Boot Start End Sectors Size Id Type
/dev/sdb1 2048 206847 204800 100M 83 Linux
[root@ndbaranov ~]# cat /proc/partitions
major minor #blocks name
8 0 41043040 sda
8 1 1048576 sda1
8 2 40893440 sda2
8 32 524288 sdc
8 16 524288 sdb
8 17 102400 sdb1
11 0 51898 sr0
253 0 36753408 dm-0
253 1 4136960 dm-1
[root@ndbaranov ~]# partprobe /dev/sdb
[root@ndbaranov ~]#
```

Создание расширенного и логического раздела

```
Activities Terminal Sep 9 14:07 en
root@ndbaranov:~

[root@ndbaranov ~]# 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): 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):

Created a new partition 2 of type 'Extended' and of size 411 MiB.

Command (m for help): n
All space for primary partitions is in use.
Adding logical partition 5
First sector (208896-1048575, default 208896):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (208896-1048575, default 1048575): +101M

Created a new partition 5 of type 'Linux' and of size 101 MiB.

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

[root@ndbaranov ~]# partprobe /dev/sdb
[root@ndbaranov ~]# cat /proc/partitions
major minor #blocks name
8          0 41943040 sda
8          1 1048576 sda1
8          2 40893440 sda2
8          32 524288 sdc
8          16 524288 sdb
8          17 102400 sdb1
8          18 1 sdb2
8          21 103424 sdb5
11         0 51808 sr0
253        0 36753408 dn-0
253        1 4136960 dn-1

[root@ndbaranov ~]# fdisk --list /dev/sdb
Disk /dev/sdb: 512 MiB, 536870912 bytes, 1048576 sectors
Disk model: VBOX HARDDISK
Units: sectors of 1 * 512 = 512 bytes
Created at 2024-09-09 14:07:11 UTC
```

Создание раздела подкачки (100 MB)

```
Activities Terminal Sep 9 14:09
root@ndbaranov:~

[root@ndbaranov ~]# 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): n
All space for primary partitions is in use.
Adding logical partition 6
First sector (417792-1048575, default 417792):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (417792-1048575, default 1048575): +100M

Created a new partition 6 of type 'Linux' and of size 100 MiB.

Command (m for help): t
Partition number (1,2,5,6, default 6): 6
Hex code or alias (type L to list all): 82

Changed type of partition 'Linux' to 'Linux swap / Solaris'.

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

[root@ndbaranov ~]# partprobe /dev/sdb
[root@ndbaranov ~]# cat /proc/partitions
major minor #blocks name
8 0 41943040 sda
8 1 1048576 sda1
8 2 40893440 sda2
8 32 524288 sdc
8 16 524288 sdb
8 17 102400 sdb1
8 18 1 sdb2
8 21 103424 sdb5
8 22 102400 sdb6
11 0 51896 sr0
253 0 36753408 dm-0
253 1 4136960 dm-1

[root@ndbaranov ~]# 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: 0xb5c08ea9
```

Форматирование и активация swap

```
Activities Terminal Sep 9 14:10 en
root@ndbaranov:~

Hex code or alias (type L to list all): 82

Changed type of partition 'Linux' to 'Linux swap / Solaris'.

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

[root@ndbaranov ~]# partprobe /dev/sdb
[root@ndbaranov ~]# cat /proc/partitions
major minor #blocks name
8 0 41943040 sda
8 1 1048576 sda1
8 2 40893440 sda2
8 32 524288 sdc
8 16 524288 sdb
8 17 102400 sdb1
8 18 1 sdb2
8 21 103424 sdb5
8 22 102400 sdb6
11 0 51808 sr0
252 0 36752408 dm-0
253 1 4136960 dm-1
[root@ndbaranov ~]# 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: 0xb5c08ea9

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
[root@ndbaranov ~]# mkswap /dev/sdb6
Setting up swspace version 1, size = 100 MiB (104853504 bytes)
no label, UUID=b38b2634-bded-4536-8ff3-e829a28db43f
[root@ndbaranov ~]# swapon /dev/sdb6
[root@ndbaranov ~]# free -m
bash: free: command not found...
[root@ndbaranov ~]# free -m
total used free shared buff/cache available
Mem: 3655 1360 1891 17 643 2294
Swap: 4139 0 4139
[root@ndbaranov ~]#
```

Работа с GPT-разделами (gdisk)

```
Activities Terminal Sep 9 14:13 en
root@ndbaranov:~

[root@ndbaranov ~]# gdisk -l /dev/sdc
GPT fdisk (gdisk) version 1.0.7

Partition table scan:
  MBR: not present
  BSD: not present
  APM: not present
  GPT: not present

Creating new GPT entries in memory.
Disk /dev/sdc: 1048576 sectors, 512.0 MiB
Model: VBOX HARDDISK
Sector size (logical/physical): 512/512 bytes
Disk identifier (GUID): E25BDAC6-D89E-4CEB-B7A0-4400F3C05385
Partition table holds up to 128 entries
Main partition table begins at sector 2 and ends at sector 33
First usable sector is 34, last usable sector is 1048542
Partitions will be aligned on 2048-sector boundaries
Total free space is 1048509 sectors (512.0 MiB)

Number Start (sector) End (sector) Size Code Name
[root@ndbaranov ~]# gdisk /dev/sdc
GPT fdisk (gdisk) version 1.0.7

Partition table scan:
  MBR: not present
  BSD: not present
  APM: not present
  GPT: not present

Creating new GPT entries in memory.

Command (? for help): n
Partition number (1-128, default 1):
First sector (34-1048542, default = 2048) or {+}size(KMGTP):
Last sector (2048-1048542, default = 1048542) or {+}size(KMGTP): +100M
Current type is 8300 (Linux filesystem)
Hex code or GUID (L to show codes, Enter = 8300):
Changed type of partition to 'Linux filesystem'

Command (? for help): p
Disk /dev/sdc: 1048576 sectors, 512.0 MiB
Model: VBOX HARDDISK
Sector size (logical/physical): 512/512 bytes
Disk identifier (GUID): F184CA24-A3BA-416A-BBAD-4EF68FB6B936
Partition table holds up to 128 entries
Main partition table begins at sector 2 and ends at sector 33
First usable sector is 34, last usable sector is 1048542
Partitions will be aligned on 2048-sector boundaries
Total free space is 843709 sectors (412.0 MiB)
```

Проверка созданного GPT-раздела

```
Activities Terminal Sep 9 14:14 en
root@ndbaranov:~

1      2048      206847    100.0 MiB    8300    Linux filesystem

Command (? for help): w

Final checks complete. About to write GPT data. THIS WILL OVERWRITE EXISTING
PARTITIONS!!

Do you want to proceed? (Y/N): Y
OK; writing new GUID partition table (GPT) to /dev/sdc.
The operation has completed successfully.
[root@ndbaranov ~]# partprobe /dev/sdc
[root@ndbaranov ~]# cat /proc/partitions
major minor #blocks name
 8        0  41943040 sda
 8        1   1048576 sda1
 8        2  40893440 sda2
 8       32   524288 sdc
 8       33  102400 sdc1
 8       16   524288 sdb
 8       17  102400 sdb1
 8       18        1 sdb2
 8       21  103424 sdb5
 8       22  102400 sdb6
11        0    51898 sr0
253       0  36753408 dm-0
253       1  4136960 dm-1
[root@ndbaranov ~]# gdisk -l /dev/sdc
GPT fdisk (gdisk) version 1.0.7

Partition table scan:
  MBR: protective
  BSD: not present
  APM: not present
  GPT: present

Found valid GPT with protective MBR; using GPT.
Disk /dev/sdc: 1048576 sectors, 512.0 MiB
Model: VBOX HARDDISK
Sector size (logical/physical): 512/512 bytes
Disk identifier (GUID): F184CA24-A3BA-416A-BBAD-4EF68FB6B936
Partition table holds up to 128 entries
Main partition table begins at sector 2 and ends at sector 33
First usable sector is 34, last usable sector is 1048542
Partitions will be aligned on 2048-sector boundaries
Total free space is 843709 sectors (412.0 MiB)

Number  Start (sector)    End (sector)  Size      Code  Name
  1            2048          206847    100.0 MiB    8300    Linux filesystem
[root@ndbaranov ~]#
```

Форматирование /dev/sdb1 в XFS

```
Activities Terminal Sep 9 14:15 en
root@ndbaranov:~

[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# mkfs.xfs /dev/sdb1
Filesystem should be larger than 300MB.
Log size should be at least 64MB.
Support for filesystems like this one is deprecated and they will not be supported in future releases.
meta-data=/dev/sdb1          isize=512    agcount=4, agsize=6400 blks
                        =      sectsz=512   attr=2, projid32bit=1
                        =      crc=1        finobt=1, sparse=1, rmapbt=0
                        =      reflink=1    bigtime=1 inobtcount=1 nrext=64=0
data      =                  bsize=4096    blocks=25600, 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
[root@ndbaranov ~]# xfs_admin -L xfsdisk /dev/sdb1
writing all SBs
new label = "xfsdisk"
[root@ndbaranov ~]#
```

Форматирование /dev/sdb5 в EXT4

```
Activities Terminal Sep 9 14:16 en
root@ndbaranov:~

[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# mkfs.ext4 /dev/sdb5
mke2fs 1.46.5 (30-Dec-2021)
Creating filesystem with 103424 1k blocks and 25896 inodes
Filesystem UUID: d6705e96-5ae5-42c3-8319-4d4c87ecc107
Superblock backups stored on blocks:
    8193, 24577, 40961, 57345, 73729

Allocating group tables: done
Writing inode tables: done
Creating journal (4096 blocks): done
Writing superblocks and filesystem accounting information: done

[root@ndbaranov ~]# tune2fs -L ext4disk /dev/sdb5
tune2fs 1.46.5 (30-Dec-2021)
[root@ndbaranov ~]# tune2fs -o acl,user_xattr /dev/sdb5
tune2fs 1.46.5 (30-Dec-2021)
[root@ndbaranov ~]#
```


Ручное монтирование раздела

```
Activities Terminal Sep 9 14:17 en
root@ndbaranov:-

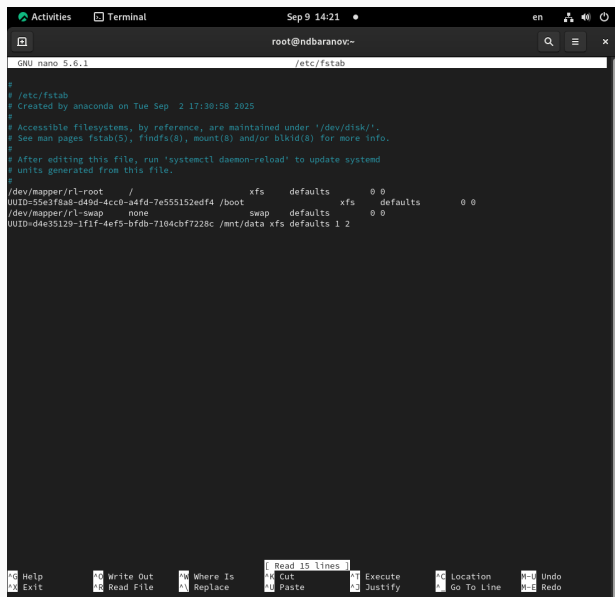
[root@ndbaranov ~]# mkdir -p /mnt/tmp
[root@ndbaranov ~]# mount /dev/sdb5 /mnt/tmp
[root@ndbaranov ~]# mount
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime,seclabel)
devtmpfs on /dev type devtmpfs (rw,nosuid,seclabel,size=4096k,nr_inodes=459655,mode=755,inode64)
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=748592k,nr_inodes=819200,mode=755,inode64)
cgroup2 on /sys/fs/cgroup type cgroup2 (rw,nosuid,nodev,noexec,relatime,seclabel,nfsdelegate,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=1736)
mqueue on /dev/mqueue type mqueue (rw,nosuid,nodev,noexec,relatime,seclabel)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime,seclabel,pagesize=2M)
debugfs on /sys/kernel/debug type debugfs (rw,nosuid,nodev,noexec,relatime,seclabel)
tracefs on /sys/kernel/tracing type tracefs (rw,nosuid,nodev,noexec,relatime,seclabel)
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)
fusectl on /sys/fs/fuse/connections type fusectl (rw,nosuid,nodev,noexec,relatime)
none on /run/credentials/systemd-tmpfiles-setup-dev.service type ramfs (ro,nosuid,nodev,noexec,relatime,seclabel,mode=7
00)
/dev/sdal on /boot 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=374292k,nr_inodes=93573,mode=700,uid=1000,g
id=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/ndbaranov/V8ox_GAS_7.2.0 type iso9660 (ro,nosuid,nodev,relatime,nojoliet,check=s,map=n,blocksize=
2048,uid=1000,gid=1000,dmnode=500,fmode=400,uhelper=udisks2)
portal on /run/user/1000/doc type fuse.portal (rw,nosuid,nodev,relatime,user_id=1000,group_id=1000)
/dev/sdb5 on /mnt/tmp type ext4 (rw,relatime,seclabel)
[root@ndbaranov ~]# umount /dev/sdb5
[root@ndbaranov ~]# 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=459655,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=748592k,nr_inodes=819200,mode=755,inode64)
cgroup2 on /sys/fs/cgroup type cgroup2 (rw,nosuid,nodev,noexec,relatime,seclabel,nfsdelegate,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=1736)
```

Автоматическое монтирование через /etc/fstab (часть 1)

```
Activities Terminal Sep 9 14:21 en
root@ndbaranov:~

[root@ndbaranov ~]# mkdir -p /mnt/data
[root@ndbaranov ~]# blkid
/dev/mapper/rl-swap: UUID="0c45516c-fb76-4781-996a-a350af13f033" TYPE="swap"
/dev/sdb5: LABEL="ext4disk" UUID="de705e96-5ae5-42c3-8319-4d4c87ecc107" TYPE="ext4" PARTUUID="b5c08ea9-05"
/dev/sdb1: LABEL="xfssdisk" UUID="d4e35129-1f1f-4ef5-bfdb-7104cbf7228c" TYPE="xfs" PARTUUID="b5c08ea9-01"
/dev/sdb6: UUID="b38b2634-bded-4536-8ff3-e829a28db43f" TYPE="swap" PARTUUID="b5c08ea9-06"
/dev/sr0: UUID="2025-08-13-20-48-09-62" LABEL="VBox_GAs_7.2.0" TYPE="iso9660"
/dev/mapper/rl-root: UUID="1ab1ae65-f3b8-4570-ab38-c2800a583263" TYPE="xfs"
/dev/sdc1: PARTLABEL="Linux filesystem" PARTUUID="a6ad38d8-f094-458f-8a55-4ed2e58ce521"
/dev/sda2: UUID="FVybeX-XlKD-QqeV-6VNO-Qkr9-3ixM-R3p7ne" TYPE="LVM2_member" PARTUUID="aef7338c-02"
/dev/sda1: UUID="55e3f8a8-d49d-4cc0-a4fd-7e555152edf4" TYPE="xfs" PARTUUID="aef7338c-01"
[root@ndbaranov ~]# blkid /dev/sdb1
/dev/sdb1: LABEL="xfssdisk" UUID="d4e35129-1f1f-4ef5-bfdb-7104cbf7228c" TYPE="xfs" PARTUUID="b5c08ea9-01"
[root@ndbaranov ~]# nano /etc/fstab
[root@ndbaranov ~]# mount -a
mount: (hint) your fstab has been modified, but systemd still uses
the old version; use 'systemctl daemon-reload' to reload.
[root@ndbaranov ~]# df -h
Filesystem      Size  Used Avail Use% Mounted on
devtmpfs        4.0M   0  4.0M   0% /dev
tmpfs           1.8G   0  1.8G   0% /dev/shm
tmpfs           732M  1.3M  730M   1% /run
/dev/mapper/rl-root 35G  11G  25G  30% /
/dev/sda1       960M  446M  515M  47% /boot
tmpfs          366M  108K  366M   1% /run/user/1000
/dev/sr0        51M   51M   0 100% /run/media/baranovn/VBox_GAs_7.2.0
/dev/sdb1       95M   6.0M   89M   7% /mnt/data
[root@ndbaranov ~]#
```

Автоматическое монтирование через /etc/fstab (часть 2)



The screenshot shows a terminal window titled "Terminal" with the date "Sep 9 14:21". The user is logged in as "root@ndbaranov:". The terminal displays the contents of the `/etc/fstab` file, which is being edited with the `nano` text editor (version 5.6.1). The file contains the following text:

```
#  
# /etc/fstab  
# Created by anaconda on Tue Sep  2 17:30:58 2025  
#  
# 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=55e3f8a8-d49d-4cc0-a4fd-7e555152edf4 /boot                xfs     defaults    0 0  
/dev/mapper/rl-swap    none                 swap     defaults    0 0  
UUID=d4e35129-1f1f-4ef5-bfdb-7104cbf7228c /mnt/data            xfs     defaults 1 2
```

At the bottom of the terminal, there is a status bar with various keyboard shortcuts for the nano editor:

- Ctrl-H Help
- Ctrl-X Exit
- Ctrl-W Write Out
- Ctrl-R Read File
- Ctrl-_ Where Is
- Ctrl-_ Replace
- Ctrl-I Read 15 lines
- Ctrl-K Cut
- Ctrl-V Paste
- Ctrl-E Execute
- Ctrl-J Justify
- Ctrl-G Location
- Ctrl-G Go To Line
- Ctrl-U Undo
- Ctrl-R Redo

Проверка автоматического монтирования

```
Activities Terminal Sep 9 14:29 en
root@ndbaranov:~

[root@ndbaranov ~]# gdisk /dev/sdc
GPT fdisk (gdisk) version 1.0.7

Partition table scan:
  MBR: protective
  BSD: not present
  APM: not present
  GPT: present

Found valid GPT with protective MBR; using GPT.

Command (? for help): n
Partition number (2-128, default 2):
First sector (34-1048542, default = 206848) or {+}-size(KMGTP):
Last sector (206848-1048542, default = 1048542) or {+}-size(KMGTP): +100Mb
Current type is 8300 (Linux filesystem)
Hex code or GUID (L to show codes, Enter = 8300):
Changed type of partition to 'Linux filesystem'

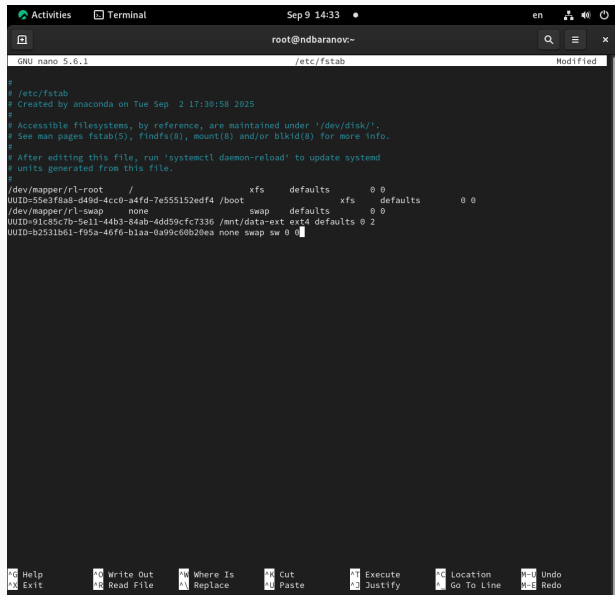
Command (? for help): n
Partition number (2-128, default 3):
First sector (34-1048542, default = 411648) or {+}-size(KMGTP):
Last sector (411648-1048542, default = 1048542) or {+}-size(KMGTP): +100M
Current type is 8300 (Linux filesystem)
Hex code or GUID (L to show codes, Enter = 8300): 8200
Changed type of partition to 'Linux swap'

Command (? for help): w

Final checks complete. About to write GPT data. THIS WILL OVERWRITE EXISTING
PARTITIONS!!

Do you want to proceed? (Y/N): Y
OK; writing new GUID partition table (GPT) to /dev/sdc.
The operation has completed successfully.
[root@ndbaranov ~]# partprobe /dev/sdc
bash: partprobe: command not found...
Similar command is: 'partprobe'
[root@ndbaranov ~]# partprobe /dev/sdc
[root@ndbaranov ~]# mkswap /dev/sdc2
Setting up swapspace version 1, size = 100 MiB (104853504 bytes)
no label, UUID=b2531b61-f95a-46f6-b1aa-0a99c60b20ea
[root@ndbaranov ~]# mkfs.ext5 /dev/sdc1
bash: mkfs.ext5: command not found...
[root@ndbaranov ~]# mkfs.ext4 /dev/sdc1
mke2fs 1.46.5 (30-Dec-2021)
Creating filesystem with 102400 1k blocks and 25584 inodes
Filesystem UUID: 91c85c7b-5e11-44b3-84ab-4dd59cfc7336
Superblock backups stored on blocks:
    8193, 24577, 40961, 57345, 73729
```

Создание дополнительных GPT-разделов



The screenshot shows a terminal window with the title bar "Activities Terminal" and the date "Sep 9 14:33". The prompt is "root@ndbaranov:~". The terminal displays the contents of the `/etc/fstab` file, which is being edited with the `nano` editor. The file contains the following text:

```
GNU nano 5.6.1 /etc/fstab Modified

#
# /etc/fstab
# Created by anaconda on Tue Sep  2 17:30:58 2025
#
# 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=55e3f8a8-d49d-4cc0-a4fd-7e555152edf4 /boot                xfs     defaults    0 0
/dev/mapper/rl-swap    none                 swap     defaults    0 0
UUID=91c85c7b-5e11-44b3-84ab-4dd59cfc7336 /mnt/data-ext        ext4     defaults    0 2
UUID=b2531b61-f95a-46f6-b1aa-0a99c60b20ea none                 swap     sw 0 0
```

At the bottom of the terminal window, there is a status bar with various keyboard shortcuts:

- Ctrl+G Help
- Ctrl+O Write Out
- Ctrl+W Where Is
- Ctrl+U Cut
- Ctrl+E Execute
- Ctrl+G Location
- Ctrl+L Undo
- Ctrl+X Exit
- Ctrl+R Read File
- Ctrl+N Replace
- Ctrl+V Paste
- Ctrl+J Justify
- Ctrl+G Go To Line
- Ctrl+E Redo

Настройка /etc/fstab (часть 1)

```
he operation has completed successfully.
root@ndbaranov ~]# patrprobe /dev/sdc
ash: patrprobe: command not found...
imilar command is: 'partprobe'
root@ndbaranov ~]# partprobe /dev/sdc
root@ndbaranov ~]# mkswap /dev/sdc2
etting up swapspase version 1, size = 100 MiB (104853504 bytes)
o label, UUID=b2531b61-f95a-46f6-b1aa-0a99c60b20ea
root@ndbaranov ~]# mkfs.ext5 /dev/sdc1
ash: mkfs.ext5: command not found...
root@ndbaranov ~]# mkfs.ext4 /dev/sdc1
ke2fs 1.46.5 (30-Dec-2021)
reating filesystem with 102400 1k blocks and 25584 inodes
ilesystem UUID: 91c85c7b-5e11-44b3-84ab-4dd59cfc7336
uperblock backups stored on blocks:
    8193, 24577, 40961, 57345, 73729

llocating group tables: done
riting inode tables: done
reating journal (4096 blocks): done
riting superblocks and filesystem accounting information: done

root@ndbaranov ~]# mkdir -p /mnt/data-ext
root@ndbaranov ~]# blkid
dev/mapper/r1-swap: UUID="0c45516c-fb76-4781-996a-a350af13f033" TYPE="swap"
dev/sdb5: LABEL="ext4disk" UUID="de705e96-5ae5-42c3-8319-4d4c87ecc107" TYPE="ext4" PARTUUID="b5c08ea9-05"
dev/sdb1: LABEL="xfsdisk" UUID="d4e35129-1f1f-4ef5-bfdb-7104cbf7228c" TYPE="xfs" PARTUUID="b5c08ea9-01"
dev/sdb6: UUID="b38b2634-bded-4536-8ff3-e829a28db43f" TYPE="swap" PARTUUID="b5c08ea9-06"
dev/sr0: UUID="2025-08-13-20-48-09-62" LABEL="VBox_GAs_7.2.0" TYPE="iso9660"
dev/mapper/r1-root: UUID="1ab1ae65-f3b8-4570-ab38-c2800a583263" TYPE="xfs"
dev/sda2: UUID="FVybeX-XIKD-DqeV-6VNO-Qkr9-3ixM-R3p7ne" TYPE="LVM2_member" PARTUUID="aef7338c-02"
dev/sda1: UUID="55e3f8a8-d49d-4cc0-a4fd-7e555152edf4" TYPE="xfs" PARTUUID="aef7338c-01"
dev/sdc2: UUID="b2531b61-f95a-46f6-b1aa-0a99c60b20ea" TYPE="swap" PARTLABEL="Linux filesystem" PARTUUID="a602060a-4049
47b1-a897-921728a28c2a"
dev/sdc3: PARTLABEL="Linux swap" PARTUUID="977422d4-f985-49a4-a2b3-267e9a079f91"
dev/sdc1: UUID="91c85c7b-5e11-44b3-84ab-4dd59cfc7336" TYPE="ext4" PARTLABEL="Linux filesystem" PARTUUID="a6ad38d8-f094
458f-8a55-4ed2e58ce521"
root@ndbaranov ~]# nano /etc/fstab
root@ndbaranov ~]# mount -a
```

Настройка /etc/fstab (часть 2)

```
Activities Terminal Sep 9 14:37 en
root@ndbaranov:~
[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# df -h /mnt/data/ext
df: /mnt/data/ext: No such file or directory
[root@ndbaranov ~]# df -h /mnt/data-ext
Filesystem      Size  Used Avail Use% Mounted on
/dev/sdc1        89M   14K   82M   1% /mnt/data-ext
[root@ndbaranov ~]# free -h
              total        used         free       shared    buff/cache   available
Mem:           3.6Gi       1.2Gi       1.9Gi         15Mi        632Mi       2.3Gi
Swap:          4.0Gi          0B       4.0Gi
```

- Получены навыки работы с **fdisk** и **gdisk**
- Созданы и отформатированы разделы (XFS, EXT4, swap)
- Настроено ручное и автоматическое монтирование
- Освоена работа с таблицами разделов MBR и GPT