

# Отчёт о лабораторной работы

## Лабораторная работа 14. Партиции, файловые системы, монтирование

Баранов Никита Дмитриевич

### Содержание

#### 1. Цель работы

Получить навыки создания разделов на диске и файловых систем.  
Получить навыки монтирования файловых систем.

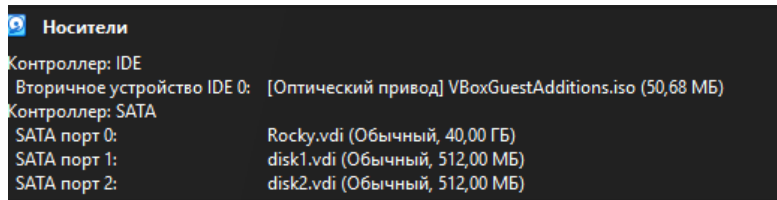
#### 2. Задание

1. Добавьте два диска на виртуальной машине (раздел 14.4.1).
2. Продемонстрируйте навыки создания разделов MBR с помощью fdisk (раздел 14.4.2).
3. Продемонстрируйте навыки создания логических разделов с помощью fdisk (раздел 14.4.3).
4. Продемонстрируйте навыки создания раздела подкачки с помощью fdisk (раздел 14.4.4).
5. Продемонстрируйте навыки создания разделов GPT с помощью gdisk (раздел 14.4.5).
6. Продемонстрируйте навыки форматирования файловой системы XFS (раздел 14.4.6).
7. Продемонстрируйте навыки форматирования файловой системы EXT4 (раздел 14.4.7).
8. Продемонстрируйте навыки ручного монтирования файловых систем (раздел 14.4.8).
9. Продемонстрируйте навыки монтирования файловых систем с помощью /etc/fstab (раздел 14.4.9).
10. Выполните задание для самостоятельной работы (раздел 14.5).

## 3. Выполнение лабораторной работы

### 3.1 Создание виртуальных носителей

Добавляем два виртуальных диска размером 512 МБ к виртуальной машине (рис. [fig:001?]).

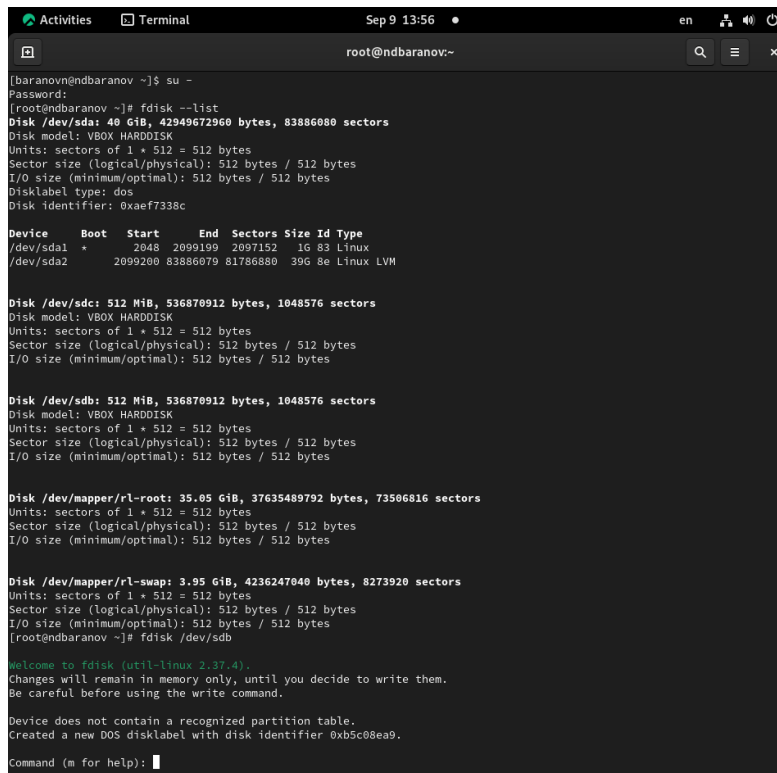


*Конфигурация виртуальных носителей*

**Добавленные диски:** - SATA порт 1: disk1.vdi (512,00 МБ) - SATA порт 2: disk2.vdi (512,00 МБ)

### 3.2 Работа с разделами MBR через fdisk

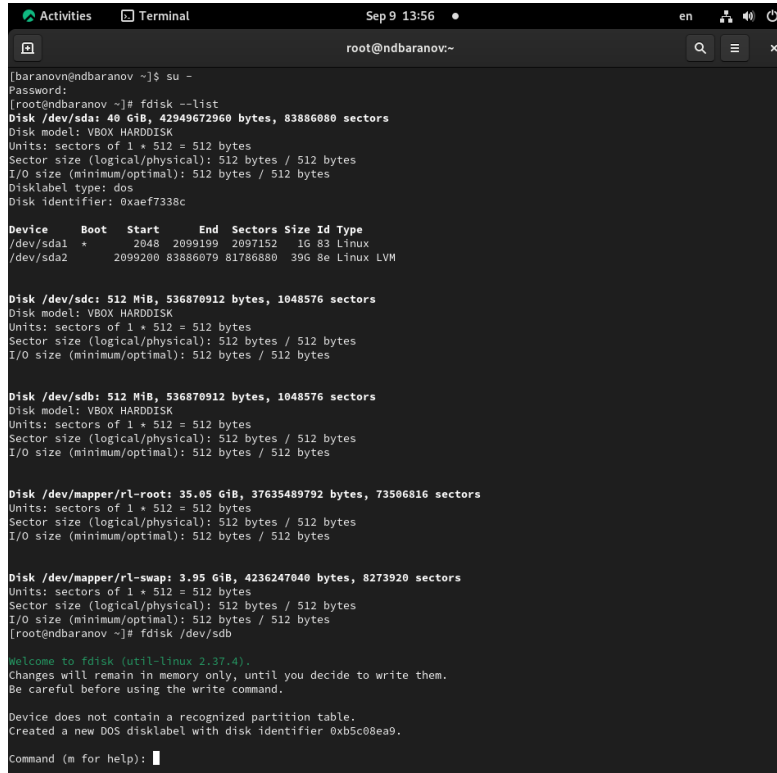
Просматриваем информацию о дисках системы (рис. [fig:002?]).



*Информация о дисках системы*

**Обнаруженные диски:** - /dev/sda: 40 ГБ (основной диск системы) - /dev/sdb: 512 МБ (добавленный диск 1) - /dev/sdc: 512 МБ (добавленный диск 2)

Запускаем fdisk для работы с диском /dev/sdb (рис. [fig:002?]).



```
[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: 0xae77338c

Device      Boot  Start      End  Sectors  Size Id Type
/dev/sda1   *    2048    2099199    2097152    1G 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):
```

Запуск fdisk для /dev/sdb

Изучаем доступные команды fdisk (рис. [fig:003?]).

```
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
f 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 HARDISK
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):
```

*Справка по командам fdisk*

Создаем основной раздел размером 100 МБ (рис. [fig:004?]).

```
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 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):
```

## Создание основного раздела

**Выполненные действия:** - Выбор типа раздела: primary (p) - Номер раздела: 1 (по умолчанию) - Первый сектор: 2048 (по умолчанию) - Последний сектор: +100M (размер 100 МБ)

Просматриваем доступные типы разделов (рис. [fig:004?]).

```
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 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):
```

## Доступные типы разделов

Устанавливаем тип раздела Linux (83) и записываем изменения (рис. [fig:005?]).

```
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 fd 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 41943040 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 ~]#
```

*Установка типа раздела и запись изменений*

Проверяем созданный раздел (рис. [fig:005?]).

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

12 Compaq diagnot 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 fd 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 41943040 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 ~]#
```

*Проверка созданного раздела*

**Разница между выводами команд:** - `fdisk -l /dev/sdb` показывает таблицу разделов диска - `cat /proc/partitions` показывает разделы, известные ядру системы

Обновляем таблицу разделов ядра (рис. [fig:005?]).



```
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 fd 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 41943040 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 ~]#
```

Обновление таблицы разделов

### 3.3 Создание логических разделов

Создаем расширенный раздел и логический раздел (рис. [fig:006?]).

```
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 408093440 sda2
 8     32  524288 sdc
 8     16  524288 sdb
 8     17 102400 sdb1
 8     18      1 sdb2
 8     21 103424 sdb5
11      0  51898 sr0
253      0 30753408 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
```

## Создание расширенного и логического разделов

**Выполненные действия:** - Создание расширенного раздела (e) на все оставшееся пространство - Создание логического раздела (5) размером 101 МБ

Проверяем созданные разделы (рис. [fig:006?]).

```
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 408093440 sda2
 8        32  924288 sdc
 8        16  524288 sdb
 8        17 102400 sdb1
 8        18      1 sdb2
 8        21 103424 sdb5
11         0  51898 sr0
253        0 30753408 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
```

## Проверка логических разделов

### 3.4 Создание раздела подкачки

Создаем раздел подкачки размером 100 МБ (рис. [fig:007?]).

```
Activities Terminal Sep 9 14:09 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
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 51898 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
```

## Создание раздела подкачки

**Выполненные действия:** - Создание логического раздела 6 размером 100 МБ - Изменение типа раздела на Linux swap (82)

Форматируем и активируем раздел подкачки (рис. [fig:008?]).

```
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 51898 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

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 swappspace version 1, size = 100 MiB (104853504 bytes)
no label, UUID=b38b2634-bded-4536-8ff3-e829a28db43f
[root@ndbaranov ~]# swapon /dev/sdb6
[root@ndbaranov ~]# введите free -m
bash: введите: 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 ~]#
```

## Форматирование и активация swap

Проверяем состояние swap-памяти (рис. [fig:008?]).

```
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 51898 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

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 swappspace version 1, size = 100 MiB (104853504 bytes)
no label, UUID=b38b2634-bded-4536-8ff3-e829a28db43f
[root@ndbaranov ~]# swapon /dev/sdb6
[root@ndbaranov ~]# введите free -m
bash: введите: 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 ~]#
```

Проверка состояния *swap*

### 3.5 Работа с разделами GPT через *gdisk*

Просматриваем информацию о диске `/dev/sdc` (рис. [fig:009?]).

```
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): E25B0AC6-D89E-4CEB-87A0-4400F3C05385
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-B8AD-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)
```

## Информация о диске GPT

Создаем раздел GPT размером 100 МБ (рис. [fig:009?]).

```
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): E25B0AC6-D89E-4CEB-87A0-4400F3C05385
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-B8AD-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)
```

## Создание раздела GPT

Записываем изменения и проверяем результат (рис. [fig:010?]).



```
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-A38A-416A-B8AD-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 ~]#
```

*Запись изменений GPT*

## 3.6 Форматирование файловых систем

Форматируем раздел /dev/sdb1 в XFS (рис. [fig:011?]).

```
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 nrext64=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    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 в XFS

Устанавливаем метку для XFS раздела (рис. [fig:011?]).

```
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 nrext64=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 ~]#
```

## Установка метки XFS

Форматируем раздел /dev/sdb5 в EXT4 (рис. [fig:012?]).

```
Activities Terminal Sep 9 14:16 en
root@ndbaranov:~
[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# mkfs.ext4 /dev/sdb5
mkfs2fs 1.46.5 (30-Dec-2021)
Creating filesystem with 103424 1k blocks and 25896 inodes
Filesystem UUID: de705e96-5ae5-42c3-8319-4d4c87ecc107
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 ~]#
```

## Форматирование в EXT4

Устанавливаем метку и параметры для EXT4 раздела (рис. [fig:012?]).

```
Activities Terminal Sep 9 14:16 en
root@ndbaranov:~
[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# mkfs.ext4 /dev/sdb5
mkfs2fs 1.46.5 (30-Dec-2021)
Creating filesystem with 103424 1k blocks and 25896 inodes
Filesystem UUID: de705e96-5ae5-42c3-8319-4d4c87ecc107
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 ~]#
```

*Настройка EXT4 раздела*

### 3.7 Ручное монтирование файловых систем

Создаем точку монтирования и монтируем раздел (рис. [fig:013?]).

```
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,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=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=700)
/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,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/ndbaranov/VBox_GAs_7.2.0 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)
/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,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=1736)
```

## Ручное монтирование раздела

Проверяем монтирование и отмонтируем раздел (рис. [fig:013?]).

```
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,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=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=700)
/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,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/ndbaranov/VBox_GMS_7.2.0 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)
/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,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=1736)
```

## Проверка и отмонтирование

### 3.8 Монтирование через /etc/fstab

Создаем точку монтирования и настраиваем автоматическое монтирование (рис. [fig:014?], [fig:015?]).

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

[root@ndbaranov ~]# mkdir -p /mnt/data
[root@ndbaranov ~]# blkid
/dev/mapper/rl-swap: UUID="9c45516c-fb76-47b1-996a-a350af13f633" TYPE="swap"
/dev/sdb5: LABEL="ext4disk" UUID="de708e96-5ae5-42c3-8319-4ddc87ecc107" TYPE="ext4" PARTUUID="b5c08ea9-05"
/dev/sdb1: LABEL="xfsdisk" UUID="d4e35129-1f1f-4ef5-bfdb-7104cbf7228c" TYPE="xfs" PARTUUID="b5c08ea9-01"
/dev/sdb6: UUID="b3b82634-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-DqeV-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="xfsdisk" 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            360M 100K   360M   1% /run/user/1000
/dev/sr0         51M   51K   0 100% /run/media/ndbaranov/VBox_GAs_7.2.0
/dev/sdb1        95M   6.0M   89M   7% /mnt/data
[root@ndbaranov ~]#
```

```
GNU nano 5.6.1 /etc/fstab
#
# /etc/fstab
# Created by anaconda on Tue Sep  2 17:38:58 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
```

```
Help      Write Out  Where Is  Read 15 lines  Cut      Execute  Location  Undo
Exit      Read File  Replace   Paste          Justify  Go To Line  Redo
```

Применяем изменения и проверяем результат (рис. [fig:014?]).



```
Activities Terminal Sep 9 14:21 en
root@ndbaranov:~
[root@ndbaranov ~]# mkdir -p /mnt/data
[root@ndbaranov ~]# blkid
/dev/mapper/rl-swap: UUID="0c45516c-fb76-47b1-996a-a350af13f033" TYPE="swap"
/dev/sdb5: LABEL="ext4disk" UUID="de708e96-8ae5-42c3-8319-4ddc87ecc107" 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/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-DqeV-6VNO-Qkr9-31xM-R3p7ne" TYPE="LVM2_member" PARTUUID="aef7338c-02"
/dev/sda1: UUID="55e3f8a8-d49d-4cc0-a4fd-7e55152edf4" TYPE="xfs" PARTUUID="aef7338c-01"
[root@ndbaranov ~]# blkid /dev/sdb1
/dev/sdb1: LABEL="xfsdisk" 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          360M 108K  360M   1% /run/user/1000
/dev/sr0        51M   51K    0 100% /run/media/baranov/VBox_GAs_7.2.0
/dev/sdb1       95M   6.0M   89M   7% /mnt/data
[root@ndbaranov ~]#
```

*Проверка автоматического монтирования*

### 3.9 Самостоятельная работа

Создаем дополнительные разделы на GPT диске (рис. **[fig:016?)**).

```
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 (3-128, 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 swappspace 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 разделов GPT

Форматируем разделы и настраиваем /etc/fstab (рис. [fig:016?], [fig:017?], [fig:018?]).

```
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 (3-128, 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 swspace 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

Activities Terminal Sep 9 14:33 en
root@ndbaranov:~

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

Help Write Out Where Is Cut Execute Location Undo
Exit Read File Replace Paste Justify Go To Line Redo
```

```

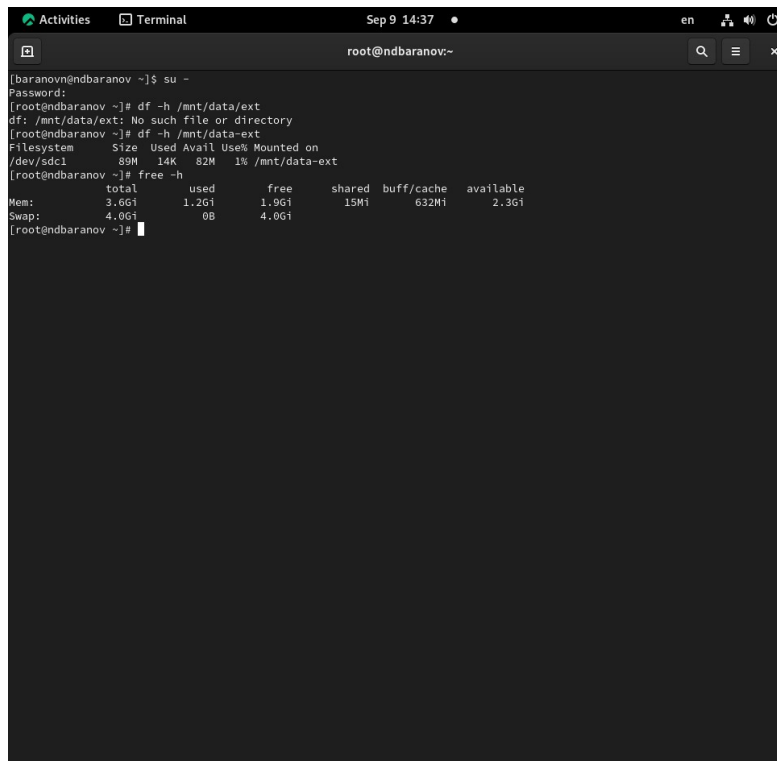
the operation has completed successfully.
root@ndbaranov ~]# partprobe /dev/sdc
ash: partprobe: command not found...
similar command is: 'partprobe'
root@ndbaranov ~]# partprobe /dev/sdc
root@ndbaranov ~]# mkswap /dev/sdc2
etting up swapspace version 1, size = 100 MiB (104853504 bytes)
o label, UUID=b2531b61-f95a-46f6-b1aa-0a99c60b20ea
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
filesystem 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="6c45516c-fb76-4781-996a-a350af13f033" TYPE="swap"
dev/sdb5: LABEL="extdisk" UUID="de705e96-8ae5-42c3-8319-4d4c87ecc107" 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-XLKD-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-a897-921728a28ca2"
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-f694-458f-8a55-4ed2e58ce521"
root@ndbaranov ~]# nano /etc/fstab
root@ndbaranov ~]# mount -a

```

Проверяем результат самостоятельной работы (рис. [fig:019?]).



```

[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:            3.0Gi       1.2Gi       1.9Gi          15Mi       632Mi       2.3Gi
Swap:            4.0Gi          0B       4.0Gi

```

*Проверка результатов*

**Результаты:** - Раздел /mnt/data-ext успешно смонтирован (89 МБ) - Общий объем swap памяти: 4.0 ГБ (включая новый раздел)

## 4. Выводы

Мы получили навыки создания разделов на диске и файловых систем.  
Получить навыки монтирования файловых систем.

## Список литературы