

# Лабораторная работа №10

Презентация

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Зубов И.А.

Российский университет дружбы народов, Москва, Россия

## Информация

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- Зубов Иван Александрович
- Студент
- Российский университет дружбы народов
- 1132243112@pfur.ru

## Выполнение лабораторной работы

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# Смотри какие устройства есть в системе

```
root@iazubov:~  
[iazubov@iazubov ~]$ su -  
Пароль:  
[root@iazubov ~]# ^[[200~lspci -k  
bash: lspci: команда не найдена...  
^C  
[root@iazubov ~]# lspci -k  
00:00.0 Host bridge: Intel Corporation 440FX - 82441FX PMC [Natoma] (rev 02)  
00:01.0 ISA bridge: Intel Corporation 82371SB PIIX3 ISA [Natoma/Triton II]  
00:01.1 IDE interface: Intel Corporation 82371AB/EB/MB PIIX4 IDE (rev 01)  
        Kernel driver in use: ata_piix  
        Kernel modules: ata_piix, ata_generic  
00:02.0 VGA compatible controller: VMware SVGA II Adapter  
        Subsystem: VMware SVGA II Adapter  
        Kernel driver in use: vmwgfx  
        Kernel modules: vmwgfx  
00:03.0 Ethernet controller: Intel Corporation 82540EM Gigabit Ethernet Controller (rev 02)  
        Subsystem: Intel Corporation PRO/1000 MT Desktop Adapter  
        Kernel driver in use: e1000  
        Kernel modules: e1000  
00:04.0 System peripheral: InnoTek Systemberatung GmbH VirtualBox Guest Service  
        Kernel driver in use: vboxguest  
        Kernel modules: vboxguest  
00:05.0 Multimedia audio controller: Intel Corporation 82801AA AC'97 Audio Controller (rev 01)  
        Subsystem: Dell Device 0177  
        Kernel driver in use: snd_intel8x0  
        Kernel modules: snd_intel8x0  
00:06.0 USB controller: Apple Inc. KeyLargo/Intrepid USB  
        Kernel driver in use: ohci-pci  
00:07.0 Bridge: Intel Corporation 82371AB/EB/MB PIIX4 ACPI (rev 08)  
        Kernel driver in use: piix4_smbus  
        Kernel modules: i2c_piix4  
00:0b.0 USB controller: Intel Corporation 82801FB/FBM/FR/FW/FRW (ICH6 Family) USB2 EHCI Controller  
        Kernel driver in use: ehci-pci  
00:0d.0 SATA controller: Intel Corporation 82801HM/HEM (ICH8M/ICH8M-E) SATA Controller [AHCI mode] (rev 02)  
        Kernel driver in use: ahci  
        Kernel modules: ahci  
[root@iazubov ~]#
```

## Загруженные модули

```
network-modules: andy
[root@iazubov ~]# lsmod | sort
ac97_bus                12288  1 snd_ac97_codec
ahci                    49152  3
ata_generic             16384  0
ata_piix                45056  1
ccp                    163840  1 kvm_amd
cdrom                   90112  2 isofs,sr_mod
crc32c_intel            24576  1
crc32_pclmul            12288  0
crc10dif_pclmul        12288  1
dm_log                  24576  2 dm_region_hash,dm_mirror
dm_mirror               28672  0
dm_mod                  245760  9 dm_log,dm_mirror
dm_region_hash          28672  1 dm_mirror
drm                     811008  7 vmwgfx,drm_kms_helper,drm_ttm_helper,ttm
drm_kms_helper          266240  2 vmwgfx,drm_ttm_helper
drm_ttm_helper          16384  2 vmwgfx
e1000                   196608  0
fuse                    212992  5
ghash_clmulni_intel    16384  0
i2c_piix4               28672  0
intel_rapl_common       57344  1 intel_rapl_msr
intel_rapl_msr          20480  0
ip_set                  69632  0
isofs                   65536  1
joydev                  28672  0
kvm                     1404928  1 kvm_amd
kvm_amd                 245760  0
libahci                 61440  1 ahci
libata                  520192  4 ata_piix,libahci,ahci,ata_generic
libcrc32c               12288  4 nf_conntrack,nf_nat,nf_tables,xfs
Module                  Size      Used by
nf_conntrack            229376  2 nf_nat,nft_ct
nf_defrag_ipv4          12288  1 nf_conntrack
nf_defrag_ipv6          24576  1 nf_conntrack
nf_nat                  65536  1 nft_chain_nat
nfnetlink               20480  3 nf_tables,ip_set
nf_reject_ipv4          16384  1 nft_reject_inet
nf_reject_ipv6          24576  1 nft_reject_inet
nf_tables               356352  189 nft_ct,nft_reject_inet,nft_fib_ipv6,nft_fib_ipv4,nft_chain_nat,nft_reject,nft_fib,nft_fi
```

## Загружаем модуль

```
[root@iazubov ~]# lsmod | grep ext4
[root@iazubov ~]# modprobe ext4
[root@iazubov ~]# lsmod | grep ext4
ext4                1191936  0
mbcache              16384    1 ext4
jbd2                 221184    1 ext4
```

## Посмотрим информацию о модуле ядра ext4

```
[root@iazubov ~]# modinfo ext4
filename:          /lib/modules/5.14.0-570.39.1.el9_6.x86_64/kernel/fs/ext4/ext4.ko.xz
softdep:           pre: crc32c
license:           GPL
description:       Fourth Extended Filesystem
author:            Remy Card, Stephen Tweedie, Andrew Morton, Andreas Dilger, Theodore Ts'o and others
alias:             fs-ext4
alias:             ext3
alias:             fs-ext3
alias:             ext2
alias:             fs-ext2
rhelversion:       9.6
srcversion:        30C9EEDC227E3D26EE09D87
depends:            jbd2,mbcache
retpoline:         Y
intree:            Y
name:              ext4
vermagic:          5.14.0-570.39.1.el9_6.x86_64 SMP preempt mod_unload modversions
sig_id:            PKCS#7
signer:            Rocky kernel signing key
sig_key:           63:AD:10:02:33:B5:DE:70:E4:AB:58:C1:A4:DB:5B:4B:31:65:42:9E
sig_hashalgo:      sha256
signature:         63:37:DC:96:17:12:13:4E:8F:DB:64:D2:9A:69:53:4D:05:32:C1:CB:
D8:1D:55:B3:38:09:75:79:76:D2:CD:09:13:B7:FE:A2:1A:A0:28:BE:
0E:FC:17:41:A8:48:B5:79:28:E2:F1:9D:FC:72:6A:C3:1F:F1:F9:25:
5E:27:A7:98:43:C8:B9:54:52:B7:7D:9C:9E:28:BF:0F:02:CA:C7:B7:
10:09:DC:4B:81:01:8E:D3:81:B2:31:82:09:E4:B8:FD:D2:38:E3:03:
BA:3E:A2:5D:A4:9B:4B:55:20:FC:80:22:8F:3E:1A:AC:CD:97:91:CF:
32:D1:47:8E:A7:9F:80:22:F8:7C:74:25:7A:CC:54:8D:C1:56:44:37:
F7:3B:6E:98:0C:49:83:A4:77:B8:E8:FD:38:17:DB:95:99:EF:14:55:
20:6D:25:C5:88:F7:AA:CC:88:87:BD:D9:0D:64:61:84:B9:30:4C:65:
DE:E0:22:DF:C9:ED:F8:85:19:78:43:4D:6E:30:0A:D7:B8:54:6A:5C:
95:D2:A6:FD:76:4D:63:23:0A:FC:22:66:98:73:92:8C:E6:2A:8B:81:
C2:CD:5E:8B:5F:38:8D:3D:9B:74:28:C0:32:52:1F:3B:4F:6F:C6:AC:
BE:9F:BE:6A:FE:D6:A2:67:22:FC:DC:5F:90:52:F0:2C:2C:A5:BA:40:
91:66:CD:1D:2E:32:57:FC:54:9B:87:78:3E:A6:11:F0:B9:F6:AF:9F:
81:97:B7:91:7F:97:90:08:E3:2D:3C:37:1D:4F:B6:59:65:BD:0C:5E:
CF:4D:85:DE:DB:2D:5E:B2:ED:8F:2D:7E:C7:C4:63:53:76:BB:6A:5B:
F9:8B:45:78:31:64:DA:BA:65:FF:01:06:F0:DA:6D:D4:63:8F:4D:7C:
18:31:21:C2:51:7B:3A:EB:90:B2:63:67:12:2F:1A:DB:7F:E2:D9:90:
B0:59:2E:B2:A4:53:3B:2A:F2:B3:B1:A3:F6:FE:D2:91:2A:A5:C1:E6:
D8:94:84:9C
```



```
[root@iazubov ~]# modprobe -r ext4
modprobe: FATAL: Module crc32c_intel is in use.
[root@iazubov ~]# modprobe -r ext4
[root@iazubov ~]# modprobe -r xfs
modprobe: FATAL: Module xfs is in use.
```

## Загрузим модуль ядра bluetooth

```
[root@iazubov ~]# lsmod | grep bluetooth
[root@iazubov ~]# modprobe bluetooth
[root@iazubov ~]# lsmod | grep bluetooth
bluetooth                1114112  0
rfkill                    40960  4 bluetooth
[root@iazubov ~]#
```

## Посмотрим информацию о модуле bluetooth

```
[root@iazubov ~]# modinfo bluetooth
filename:      /lib/modules/5.14.0-570.39.1.el9_6.x86_64/kernel/net/bluetooth/bluetooth.ko.xz
alias:         net-pf-31
license:       GPL
version:       2.22
description:    Bluetooth Core ver 2.22
author:        Marcel Holtmann <marcel@holtmann.org>
rhelversion:   9.6
srcversion:    C6ED64896F8C9A31FC91B17
depends:        rfkill
retpoline:     Y
intree:        Y
name:          bluetooth
vermagic:      5.14.0-570.39.1.el9_6.x86_64 SMP preempt mod_unload modversions
sig_id:        PKCS#7
signer:        Rocky kernel signing key
sig_key:       63:AD:10:02:33:B5:DE:70:E4:AB:58:C1:A4:DB:5B:4B:31:65:42:9E
sig_hashalgo:  sha256
signature:     B2:BD:44:95:4D:D2:F6:C3:46:2C:8F:E8:87:24:88:F9:4A:04:93:91:
5F:6D:A2:29:C9:8E:2C:22:3C:79:8E:2F:A2:9A:17:65:30:B7:0A:42:
4F:C8:DB:18:A2:0D:F5:54:03:D6:82:9E:3E:43:50:81:0B:24:A8:FF:
65:EB:E9:D1:B0:B0:B7:20:B5:83:D2:A0:71:23:1F:74:E5:3A:52:ED:
8C:61:29:68:F4:5E:F6:56:2D:40:85:2F:8D:2B:1E:88:92:07:8B:5D:
AC:40:D3:9C:CD:DA:ED:D7:67:59:B6:DB:99:2B:D7:89:BF:AD:DC:35:
11:30:7B:EB:F3:95:00:16:34:EA:B4:FB:26:42:5D:0F:5F:AD:68:E4:
13:08:5F:5A:98:3B:3E:38:00:0D:BA:C8:C1:5F:BF:F5:F4:F5:E3:E3:
0E:55:D1:9B:E1:26:EF:CF:C5:00:17:D5:D7:9E:6E:A9:F7:54:E2:27:
EC:FF:68:1F:91:20:D5:84:BE:B2:CF:68:DB:E2:36:C5:D1:93:F5:E3:
9D:65:EA:F2:3B:A8:EC:41:1E:6C:6A:35:78:7A:76:9A:F1:C6:E8:47:
70:78:12:FF:73:17:64:DA:F5:F1:68:EB:EB:E1:29:F8:78:C3:7F:C8:
33:B1:65:E3:85:2A:FF:1B:27:4F:C8:4F:62:39:D6:22:C9:FA:6F:34:
DE:87:5D:47:FF:D3:B6:C7:F6:2D:A3:8F:EF:33:0C:10:5E:29:8F:88:
DD:53:EB:97:B8:1F:77:74:DF:1E:A6:FA:86:27:01:FC:56:C8:D9:E5:
C7:6C:C8:DC:B3:0F:E9:6E:61:6C:5C:F8:F7:C8:C8:2D:E7:AB:05:A1:
F5:C0:BB:C8:35:CE:23:11:B8:25:4C:2E:E8:A3:AB:DA:B2:D4:B0:E7:
63:F5:2D:AC:10:42:1C:86:AB:15:E7:51:4E:0E:11:3A:E0:CD:9C:9C:
43:16:8D:F3:BC:AE:3A:61:F6:D2:15:50:3C:C0:13:66:68:01:32:90:
5F:CA:DF:E9
parm:         disable_esco:Disable eSCO connection creation (bool)
parm:         disable_ertm:Disable enhanced retransmission mode (bool)
parm:         enable_ecred:Enable enhanced credit flow control mode (bool)
[root@iazubov ~]# modprobe -r bluetooth
```

# Пакеты ядра

```
vermagic:      5.14.0-570.39.1.el9_6.x86_64 SMP preempt mod_unload modversions
sig_id:        PKCS#7
signer:        Rocky kernel signing key
sig_key:       63:AD:10:02:33:B5:DE:70:E4:AB:58:C1:A4:DB:5B:4B:31:65:42:9E
sig_hashalgo:  sha256
signature:     B2:BD:44:95:4D:D2:F6:C3:46:2C:8F:E8:87:24:88:F9:4A:04:93:91:
               5F:6D:A2:29:C9:8E:2C:22:3C:79:8E:2F:A2:9A:17:65:30:B7:0A:42:
               4F:C8:DB:18:A2:0D:F5:54:03:D6:82:9E:3E:43:50:81:0B:24:A8:FF:
               65:EB:E9:D1:B0:80:B7:20:B5:83:D2:A0:71:23:1F:74:E5:3A:52:ED:
               8C:61:29:68:F4:5E:F6:56:2D:40:85:2F:8D:2B:1E:88:92:07:8B:5D:
               AC:40:D3:9C:CD:DA:ED:D7:67:59:B6:DB:99:2B:D7:89:BF:AD:DC:35:
               11:30:7B:EB:F3:95:00:16:34:EA:B4:FB:26:42:5D:0F:5F:AD:68:E4:
               13:08:5F:5A:98:3B:3E:38:00:0D:BA:C8:C1:5F:BF:F5:F4:F5:E3:E3:
               0E:55:D1:9B:E1:26:EF:CF:C5:00:17:D5:D7:9E:6E:A9:F7:54:E2:27:
               EC:FF:68:1F:91:20:D5:84:BE:B2:CF:68:DB:E2:36:C5:D1:93:F5:E3:
               9D:65:EA:F2:3B:A8:EC:41:1E:6C:6A:35:78:7A:76:9A:F1:C6:E8:47:
               70:78:12:FF:73:17:64:DA:F5:F1:68:EB:EB:E1:29:F8:78:C3:7F:C8:
               33:B1:65:E3:85:2A:FF:1B:27:4F:C8:4F:62:39:D6:22:C9:FA:6F:34:
               DE:87:5D:47:FF:D3:B6:C7:F6:2D:A3:8F:EF:33:0C:10:5E:29:8F:88:
               DD:53:EB:97:B8:1F:77:74:DF:1E:A6:FA:86:27:01:FC:56:CB:D9:E5:
               C7:6C:C8:DC:B3:0F:E9:6E:61:6C:5C:F8:F7:C8:C8:2D:E7:AB:05:A1:
               F5:C0:BB:CB:35:CE:23:11:B8:25:4C:2E:E8:A3:AB:DA:B2:D4:B0:E7:
               63:F5:2D:AC:10:42:1C:86:AB:15:E7:51:4E:0E:11:3A:E0:CD:9C:9C:
               43:16:8D:F3:BC:AE:3A:61:F6:D2:15:50:3C:C0:13:66:68:01:32:90:
               5F:CA:DF:E9

parm:          disable_esco:Disable eSCO connection creation (bool)
parm:          disable_ertm:Disable enhanced retransmission mode (bool)
parm:          enable_ecred:Enable enhanced credit flow control mode (bool)

[root@iazubov ~]# modprobe -r bluetooth
[root@iazubov ~]# uname -r
5.14.0-570.39.1.el9_6.x86_64
[root@iazubov ~]# dnf list kernel

Extra Packages for Enterprise Linux 9 - x86_64                26 kB/s | 34 kB    00:01
Extra Packages for Enterprise Linux 9 - x86_64                4.2 MB/s | 20 MB   00:04
Rocky Linux 9 - BaseOS                                         593 B/s | 4.1 kB   00:07
Rocky Linux 9 - BaseOS                                         2.3 MB/s | 2.5 MB   00:01
Rocky Linux 9 - AppStream                                       8.3 kB/s | 4.5 kB   00:00
Rocky Linux 9 - AppStream                                       4.1 MB/s | 9.5 MB   00:02
Rocky Linux 9 - Extras                                         8.4 kB/s | 2.9 kB   00:00

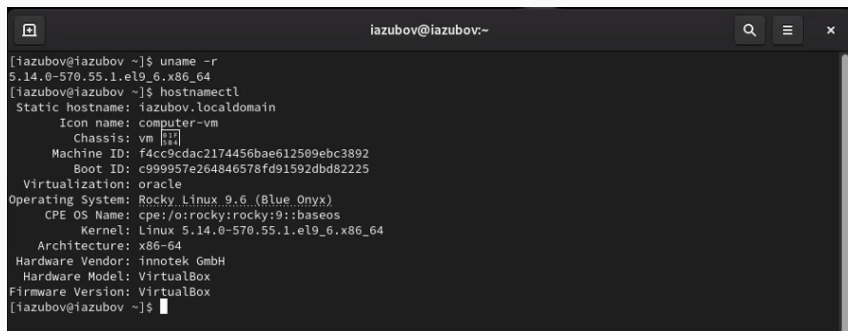
Установленные пакеты
kernel.x86_64          5.14.0-570.17.1.el9_6          @anaconda
kernel.x86_64          5.14.0-570.37.1.el9_6          @baseos
kernel.x86_64          5.14.0-570.39.1.el9_6          @baseos

Имеющиеся пакеты
kernel.x86_64          5.14.0-570.55.1.el9_6          baseos
```

```
[root@iazubov ~]# dnf upgrade --refresh
Extra Packages for Enterprise Linux 9 - x86_64                31 kB/s | 34 kB    00:01
Extra Packages for Enterprise Linux 9 openh264 (From Cisco) - x86_64  2.0 kB/s | 993 B   00:00
Rocky Linux 9 - BaseOS                                           9.9 kB/s | 4.1 kB   00:00
Rocky Linux 9 - AppStream                                         2.8 kB/s | 4.5 kB   00:01
Rocky Linux 9 - Extras                                             8.3 kB/s | 2.9 kB   00:00
```

```
Выполнено!
[root@iazubov ~]# dnf update kernel
Последняя проверка окончания срока действия метаданных: 0:25:10 назад, Ср 29 окт 2025 18:18:01.
Зависимости разрешены.
Отсутствуют действия для выполнения.
Выполнено!
[root@iazubov ~]# dnf update
Последняя проверка окончания срока действия метаданных: 0:25:19 назад, Ср 29 окт 2025 18:18:01.
Зависимости разрешены.
Отсутствуют действия для выполнения.
Выполнено!
[root@iazubov ~]# dnf upgrade --refresh
Extra Packages for Enterprise Linux 9 - x86_64                62 kB/s | 36 kB      00:00
Extra Packages for Enterprise Linux 9 openh264 (From Cisco) - x86_64 1.4 kB/s | 993 B     00:00
Rocky Linux 9 - BaseOS                                         8.9 kB/s | 4.1 kB    00:00
Rocky Linux 9 - AppStream                                     11 kB/s | 4.5 kB     00:00
Rocky Linux 9 - Extras                                         7.6 kB/s | 2.9 kB     00:00
Зависимости разрешены.
Отсутствуют действия для выполнения.
Выполнено!
[root@iazubov ~]# reboot
```

## Смотрим версию ядра

A terminal window with a dark background and light text. The window title is 'iazubov@iazubov:~'. It contains the output of the 'uname -r' and 'hostnamectl' commands. The 'uname -r' command shows the kernel version '5.14.0-570.55.1.el9\_6.x86\_64'. The 'hostnamectl' command shows various system details including static hostname, icon name, chassis, machine ID, boot ID, virtualization type, operating system, CPE OS Name, kernel, architecture, hardware vendor, hardware model, and firmware version.

```
iazubov@iazubov:~  
[iazubov@iazubov ~]$ uname -r  
5.14.0-570.55.1.el9_6.x86_64  
[iazubov@iazubov ~]$ hostnamectl  
Static hostname: iazubov.localdomain  
Icon name: computer-vm  
Chassis: vm  
Machine ID: f4cc9cdac2174456bae612509ebc3892  
Boot ID: c999957e264846578fd91592dbd82225  
Virtualization: oracle  
Operating System: Rocky Linux 9.6 (Blue Onyx)  
CPE OS Name: cpe:/o:rocky:rocky:9::baseos  
Kernel: Linux 5.14.0-570.55.1.el9_6.x86_64  
Architecture: x86-64  
Hardware Vendor: innotek GmbH  
Hardware Model: VirtualBox  
Firmware Version: VirtualBox  
[iazubov@iazubov ~]$
```