

РОССИЙСКИЙ УНИВЕРСИТЕТ ДРУЖБЫ НАРОДОВ
Факультет физико-математических и естественных наук
Кафедра прикладной информатики и теории вероятностей



Отчет по лабораторной работе №1

Дисциплина: Операционные системы

Отчет подготовила
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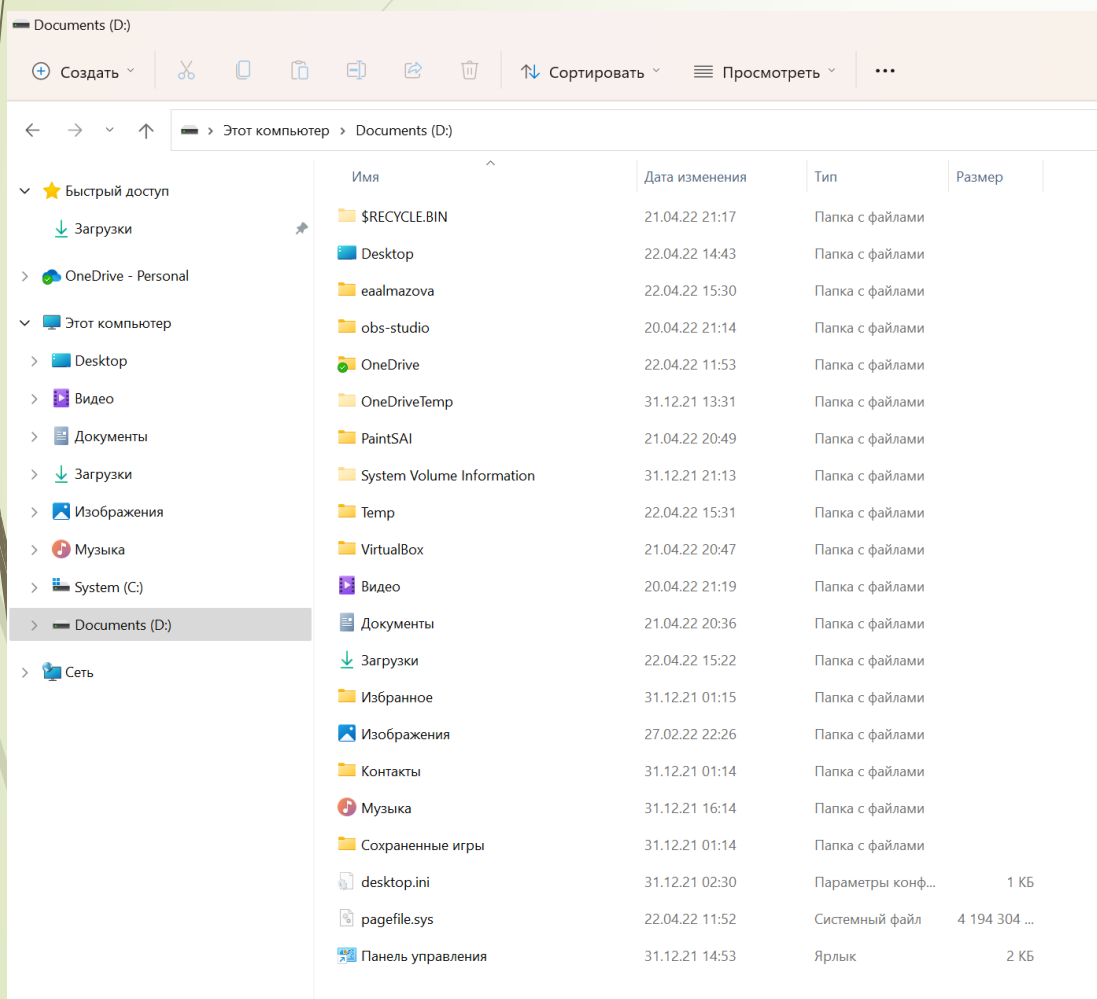


Цель работы и задание

Цель работы: приобретение практических навыков установки операционной системы на виртуальную машину, настройки минимально необходимых для дальнейшей работы сервисов.

Задание: установить операционную систему Fedora на виртуальную машину VirtualBox и выполнить настройку минимально необходимых для дальнейшей работы сервисов.

Ход работы. Создание каталога для виртуальных машин



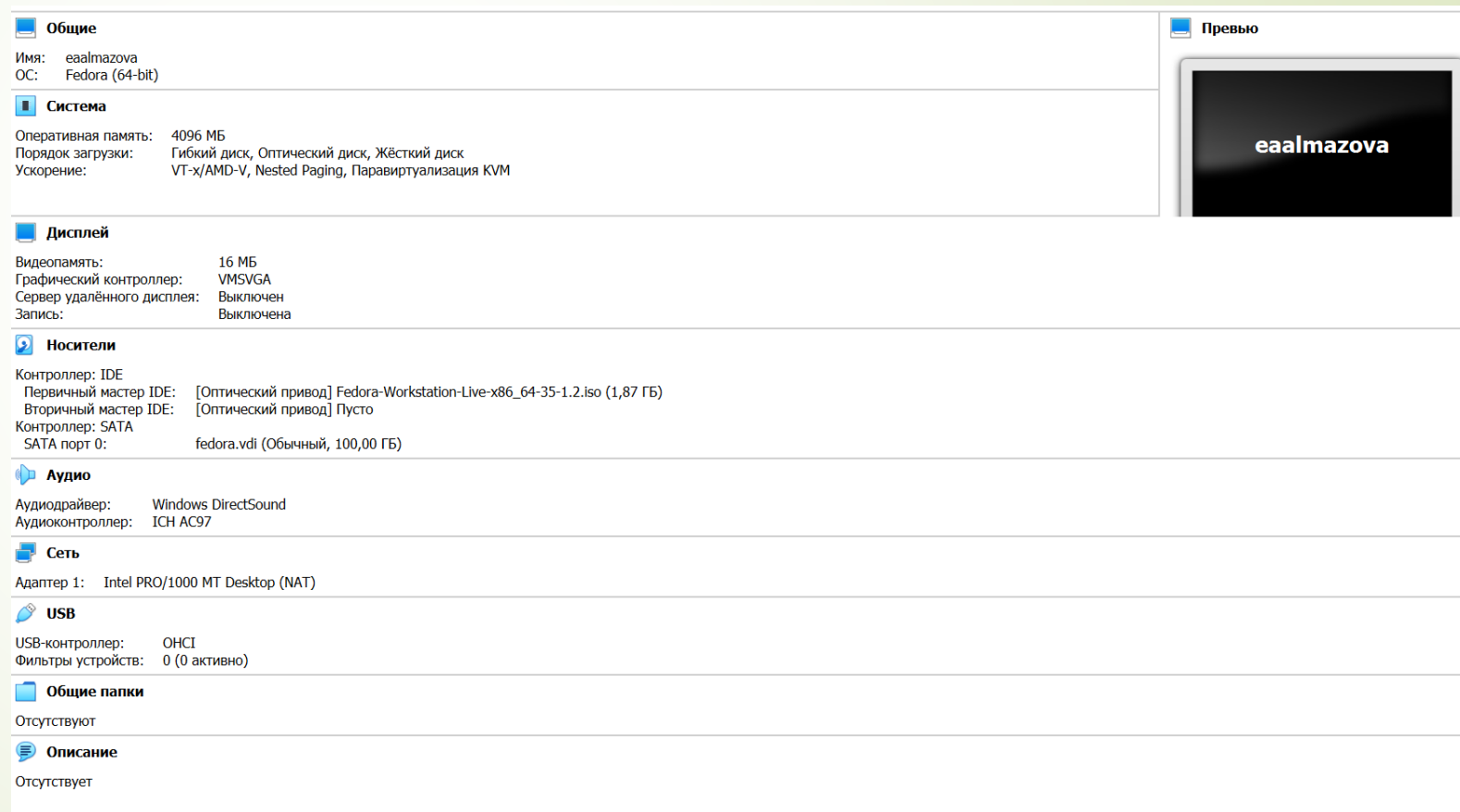
Создала папку eaalmazova на диске D: для дальнейшего расположения виртуальных машин.

Ход работы. Создание виртуальной машины

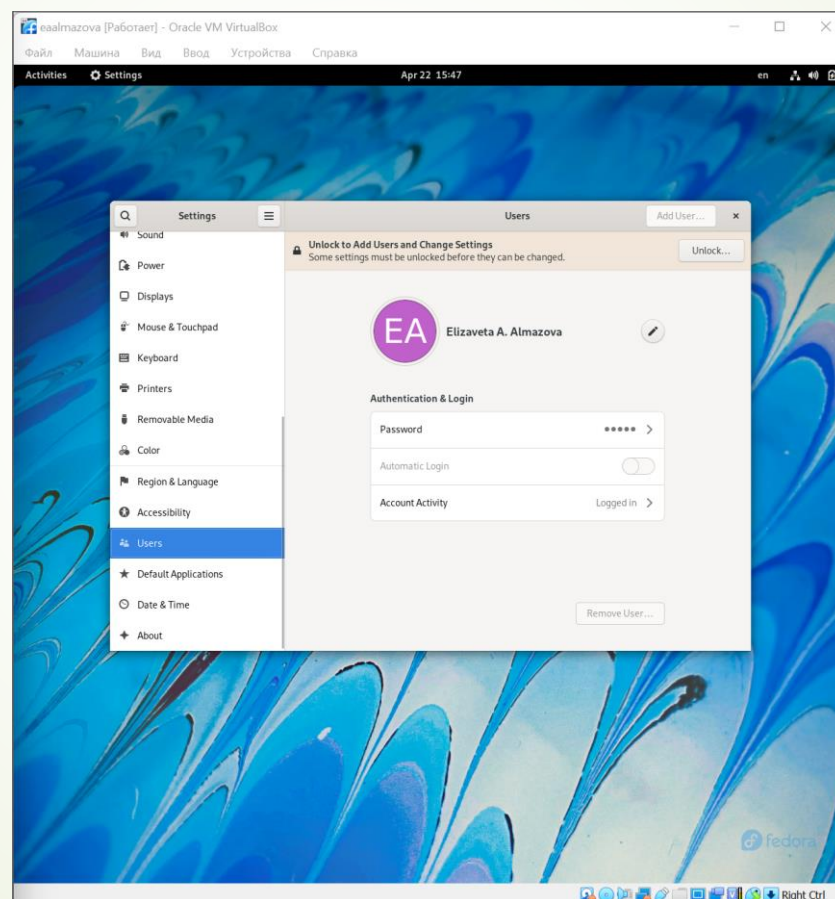
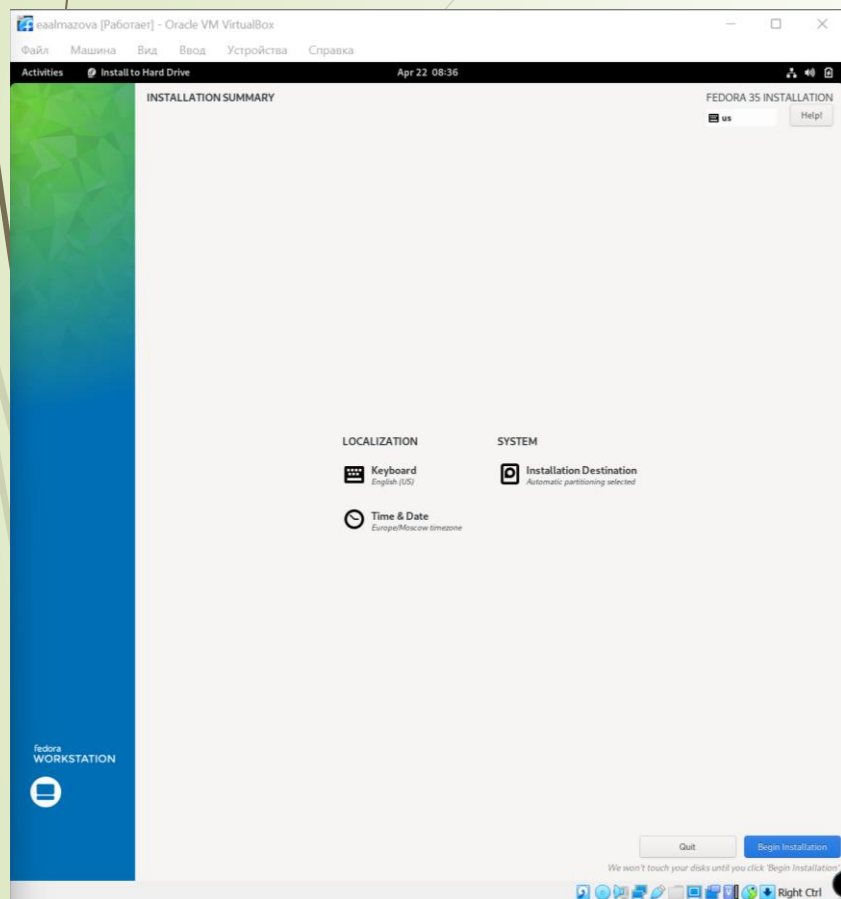
В приложении VirtualBox я создала виртуальную машину eaalmazova с характеристиками:

- Тип ОС – Linux, Fedora(64 bit);
- Основная память – 4 ГБ;
- Жесткий диск – загрузочный, VDI, динамический виртуальный диск;
- Размер диска – 100 Гб.

Добавила новый привод оптических дисков, выбрав скачанный образ диска.



Ход работы. Настройка установки ОС и создание учетной записи

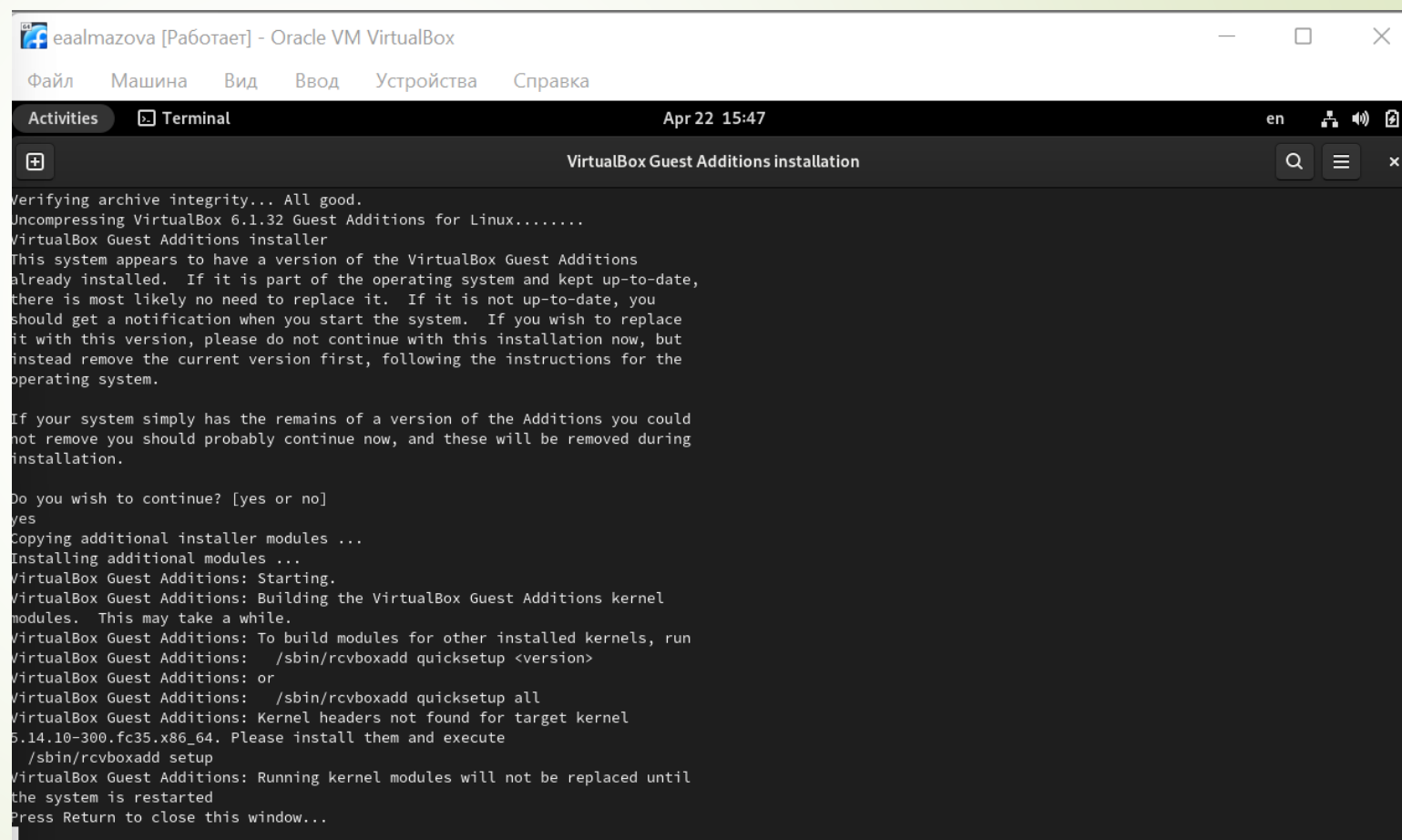


Выбрала часовой пояс (Москва), английскую раскладку и оставила место установки ОС без изменений.

Перезапустила ВМ, вручную отключила оптический диск, установила имя и пароль пользователя.

Ход работы. Подключение образа диска дополнений гостевой ОС

В меню Устройства
ВМ подключила образ
диска дополнений
гостевой ОС. Ввела
пароль пользователя
root. После окончания
установки
перезапустила ВМ.



```
eaalmazova [Работает] - Oracle VM VirtualBox
Файл  Машина  Вид  Ввод  Устройства  Справка
Activities  Terminal  Apr 22 15:47  en
VirtualBox Guest Additions installation

Verifying archive integrity... All good.
Uncompressing VirtualBox 6.1.32 Guest Additions for Linux.....
VirtualBox Guest Additions installer
This system appears to have a version of the VirtualBox Guest Additions
already installed.  If it is part of the operating system and kept up-to-date,
there is most likely no need to replace it.  If it is not up-to-date, you
should get a notification when you start the system.  If you wish to replace
it with this version, please do not continue with this installation now, but
instead remove the current version first, following the instructions for the
operating system.

If your system simply has the remains of a version of the Additions you could
not remove you should probably continue now, and these will be removed during
installation.

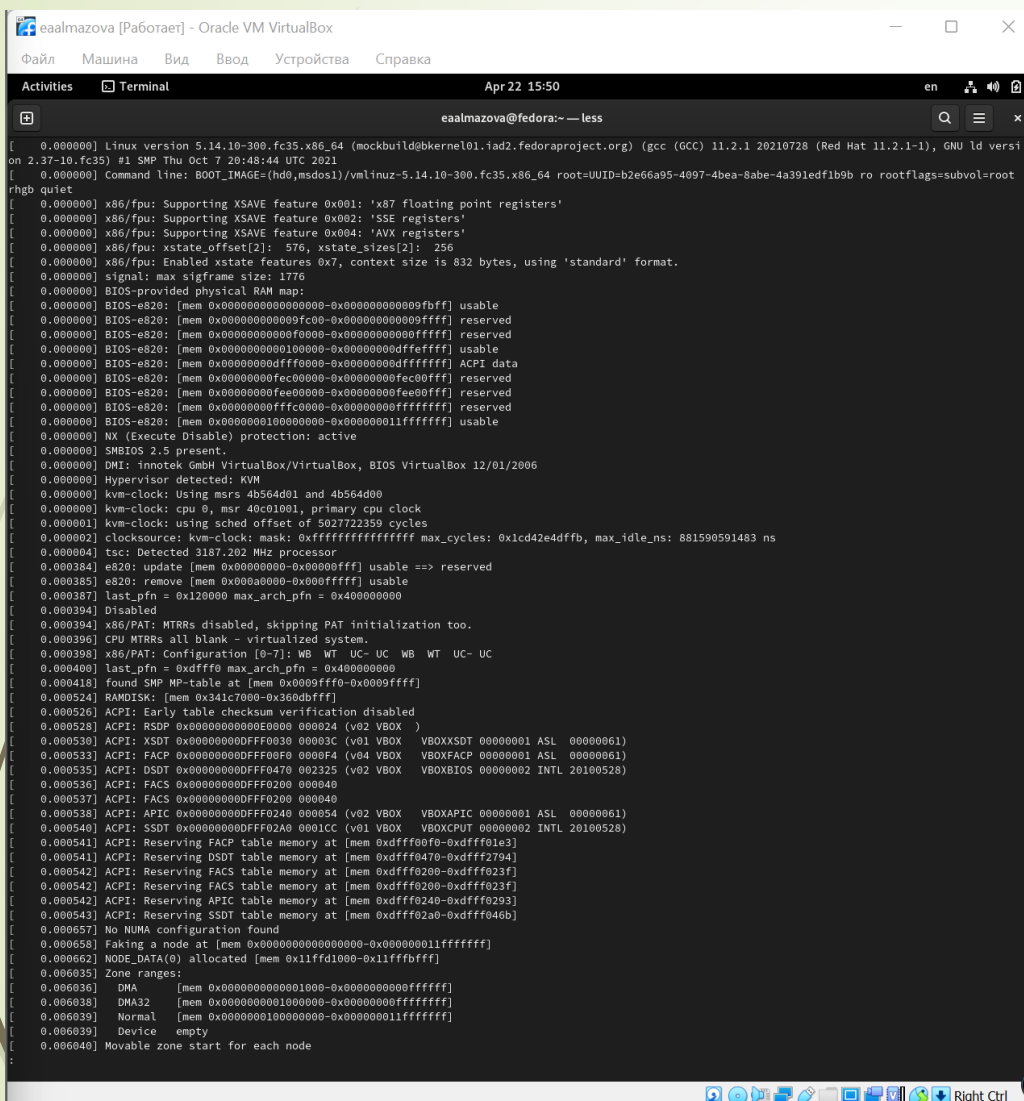
Do you wish to continue? [yes or no]
yes
Copying additional installer modules ...
Installing additional modules ...
VirtualBox Guest Additions: Starting.
VirtualBox Guest Additions: Building the VirtualBox Guest Additions kernel
modules.  This may take a while.
VirtualBox Guest Additions: To build modules for other installed kernels, run
VirtualBox Guest Additions: /sbin/rcvboxadd quicksetup <version>
VirtualBox Guest Additions: or
VirtualBox Guest Additions: /sbin/rcvboxadd quicksetup all
VirtualBox Guest Additions: Kernel headers not found for target kernel
5.14.10-300.fc35.x86_64. Please install them and execute
/sbin/rcvboxadd setup
VirtualBox Guest Additions: Running kernel modules will not be replaced until
the system is restarted
Press Return to close this window...
```



Вывод

В ходе выполнения данной лабораторной работы я узнала, что такое виртуальная машина и как она работает, получила практические навыки установки операционной системы **Fedora** на виртуальную машину, настройки минимально необходимых для дальнейшей работы сервисов.

Домашнее задание



```
ealimazova@fedora:~$ dmesg | less
[ 0.000000] Linux version 5.14.10-300.fc35.x86_64 (mockbuild@kernel01.iad2.fedoraproject.org) (gcc (GCC) 11.2.1 20210728 (Red Hat 11.2.1-1), GNU ld versi
on 2.37-10.fc35) #1 SMP Thu Oct 7 20:48:44 UTC 2021
[ 0.000000] Command line: BOOT_IMAGE=(hd0,msdos1)/vmlinuz-5.14.10-300.fc35.x86_64 root=UUID=b2e66a95-4097-4bea-8abe-4a391edf1b9b ro rootflags=subvol=root
rhgb quiet
[ 0.000000] x86/fpu: Supporting XSAVE feature 0x001: 'x87 floating point registers'
[ 0.000000] x86/fpu: Supporting XSAVE feature 0x002: 'SSE registers'
[ 0.000000] x86/fpu: Supporting XSAVE feature 0x004: 'AVX registers'
[ 0.000000] x86/fpu: xstate_offset[2]: 576, xstate_sizes[2]: 256
[ 0.000000] x86/fpu: Enabled xstate features 0x7, context size is 832 bytes, using 'standard' format.
[ 0.000000] signal: max sigframe size: 1776
[ 0.000000] BIOS-provided physical RAM map:
[ 0.000000] BIOS-e820: [mem 0x0000000000000000-0x0000000000000bfff] usable
[ 0.000000] BIOS-e820: [mem 0x0000000000000fc00-0x0000000000000ffff] reserved
[ 0.000000] BIOS-e820: [mem 0x0000000000000000-0x0000000000000ffff] reserved
[ 0.000000] BIOS-e820: [mem 0x0000000000100000-0x000000000000dffff] usable
[ 0.000000] BIOS-e820: [mem 0x0000000000000000-0x000000000000dffff] ACPI data
[ 0.000000] BIOS-e820: [mem 0x000000000fec0000-0x000000000fec00fff] reserved
[ 0.000000] BIOS-e820: [mem 0x000000000fee0000-0x000000000fee00fff] reserved
[ 0.000000] BIOS-e820: [mem 0x000000000fff0000-0x000000000ffff0fff] reserved
[ 0.000000] BIOS-e820: [mem 0x0000000010000000-0x00000000100000fff] usable
[ 0.000000] NX (Execute Disable) protection: active
[ 0.000000] SMBIOS 2.5 present
[ 0.000000] DMI: innotek GmbH VirtualBox/VirtualBox, BIOS VirtualBox 12/01/2006
[ 0.000000] Hypervisor detected: KVM
[ 0.000000] kvm-clock: Using msrs 4b564d01 and 4b564d00
[ 0.000000] kvm-clock: cpu 0, msr 40c01001, primary cpu clock
[ 0.000001] kvm-clock: using sched offset of 5027722359 cycles
[ 0.000002] clocksource: kvm-clock: mask: 0xffffffffffffffff max_cycles: 0x1cd42e4dffb, max_idle_ns: 881590591483 ns
[ 0.000004] tsc: Detected 3187.202 MHz processor
[ 0.000384] e820: update [mem 0x00000000-0x000000fff] usable ==> reserved
[ 0.000385] e820: remove [mem 0x000a0000-0x000000fff] usable
[ 0.000387] last_pfn = 0x120000 max_arch_pfn = 0x400000000
[ 0.000394] Disabled
[ 0.000394] x86/PAT: MTRRs disabled, skipping PAT initialization too.
[ 0.000396] CPU MTRRs all blank - virtualized system.
[ 0.000398] x86/PAT: Configuration [0-7]: WB WT UC- UC WB WT UC- UC
[ 0.000400] last_pfn = 0xdffff0 max_arch_pfn = 0x400000000
[ 0.000418] found SMP MP-table at [mem 0x0009fff0-0x0009ffff]
[ 0.000524] RAMDISK: [mem 0x341c7000-0x360dbfff]
[ 0.000526] ACPI: Early table checksum verification disabled
[ 0.000528] ACPI: RSDP 0x0000000000000000 000024 (v02 VBOX )
[ 0.000530] ACPI: XSDT 0x0000000000000000 00003C (v01 VBOX VBOXXSDT 00000001 ASL 00000001)
[ 0.000533] ACPI: FACP 0x0000000000000000 0000F4 (v04 VBOX VBOXFACP 00000001 ASL 00000001)
[ 0.000535] ACPI: DSDT 0x0000000000000000 002325 (v02 VBOX VBOXBIOS 00000002 INTL 20100528)
[ 0.000536] ACPI: FACS 0x0000000000000000 000040
[ 0.000537] ACPI: FACS 0x0000000000000000 000040
[ 0.000538] ACPI: APIC 0x0000000000000000 000054 (v02 VBOX VBOXAPIC 00000001 ASL 00000001)
[ 0.000540] ACPI: SSDT 0x0000000000000000 0001CC (v01 VBOX VBOXCPU 00000002 INTL 20100528)
[ 0.000541] ACPI: Reserving FACP table memory at [mem 0xdffff00f0-0xdffff01e3]
[ 0.000541] ACPI: Reserving DSDT table memory at [mem 0xdffff0470-0xdffff2794]
[ 0.000542] ACPI: Reserving FACS table memory at [mem 0xdffff0200-0xdffff023f]
[ 0.000542] ACPI: Reserving FACS table memory at [mem 0xdffff0200-0xdffff023f]
[ 0.000542] ACPI: Reserving APIC table memory at [mem 0xdffff0240-0xdffff0293]
[ 0.000543] ACPI: Reserving SSDT table memory at [mem 0xdffff02a0-0xdffff040b]
[ 0.000571] No NUMA configuration found
[ 0.000658] Faking a node at [mem 0x0000000000000000-0x00000000100000fff]
[ 0.000662] NODE_DATA(0) allocated [mem 0x11fdd1000-0x11fffbfff]
[ 0.000635] Zone ranges:
[ 0.000636] DMA [mem 0x0000000000000000-0x0000000000000ffff]
[ 0.000638] DMA32 [mem 0x0000000000000000-0x0000000000000ffff]
[ 0.000639] Normal [mem 0x0000000010000000-0x00000000100000fff]
[ 0.000639] Device empty
[ 0.000640] Movable zone start for each node
```

Я открыла терминал и проанализировала последовательность загрузки системы, выполнив команду `dmesg`. Я просмотрела вывод этой команды с помощью команды `dmesg | less`.

Домашнее задание

Используя поиск с помощью `grep` (команда `dmesg | grep -i "<запрос>"`), я получила следующую информацию:

- Версия ядра Linux ("Linux version");
- Частота процессора ("processor");
- Модель процессора ("CPU0");
- Объем доступной оперативной памяти ("Memory");
- Тип обнаруженного гипервизора ("Hypervisor");
- Тип файловой системы корневого раздела ("root", "File system", "mount");
- Последовательность монтирования файловых систем ("File system", "mount").

```
eaalmazova [Работает] - Oracle VM VirtualBox
Файл Машина Вид Ввод Устройства Справка
Apr 22 16:01 en
eaalmazova@fedora:~$ dmesg | grep -i "Linux version"
0.000000] Linux version 5.14.10-300.fc35.x86_64 (mockbuild@bkernel01.iad2.fedoraproject.org) (gcc (GCC) 11.2.1 20210728 (Red Hat 11.2.1-1), GNU ld vers
on 2.37-10.fc35) #1 SMP Thu Oct 7 20:48:44 UTC 2021
eaalmazova@fedora ~]$ dmesg | grep -i "processor"
0.000004] tsc: Detected 3187.202 MHz processor
0.153664] smptboot: Total of 1 processors activated (6374.40 BogoMIPS)
0.215410] ACPI: Added _OSI(Processor Device)
0.215411] ACPI: Added _OSI(Processor Aggregator Device)
eaalmazova@fedora ~]$ dmesg | grep -i "CPU0"
0.153582] smptboot: CPU0: 12th Gen Intel(R) Core(TM) i9-12900K (family: 0x6, model: 0x97, stepping: 0x2)
eaalmazova@fedora ~]$ dmesg | grep -i "Memory"
0.000525] ACPI: Reserving FACP table memory at [mem 0xdfff00f0-0xdfff01e3]
0.000526] ACPI: Reserving DSDT table memory at [mem 0xdfff0470-0xdfff2794]
0.000526] ACPI: Reserving FACS table memory at [mem 0xdfff0200-0xdfff023f]
0.000526] ACPI: Reserving FACS table memory at [mem 0xdfff0200-0xdfff023f]
0.000527] ACPI: Reserving APIC table memory at [mem 0xdfff0240-0xdfff0293]
0.000527] ACPI: Reserving SSDT table memory at [mem 0xdfff02a0-0xdfff046b]
0.006173] Early memory node ranges
0.011890] PM: hibernation: Registered nosave memory: [mem 0x00000000-0x00000fff]
0.011891] PM: hibernation: Registered nosave memory: [mem 0x0009f000-0x0009ffff]
0.011892] PM: hibernation: Registered nosave memory: [mem 0x000a0000-0x000aefff]
0.011892] PM: hibernation: Registered nosave memory: [mem 0x000f0000-0x000fffff]
0.011893] PM: hibernation: Registered nosave memory: [mem 0xdfff0000-0xdfffffff]
0.011893] PM: hibernation: Registered nosave memory: [mem 0xe0000000-0xfefbffff]
0.011893] PM: hibernation: Registered nosave memory: [mem 0xfec00000-0xfec0ffff]
0.011894] PM: hibernation: Registered nosave memory: [mem 0xfec01000-0xfedfffff]
0.011894] PM: hibernation: Registered nosave memory: [mem 0xfec00000-0xfec0ffff]
0.011894] PM: hibernation: Registered nosave memory: [mem 0xfec01000-0xfefbffff]
0.011895] PM: hibernation: Registered nosave memory: [mem 0xfec00000-0xfefbffff]
0.027481] Memory: 3967300K/4193848K available (16393K kernel code, 3531K rdata, 10388K rodata, 2872K init, 4908K bss, 226288K reserved, 0K cma-reserved)

0.051335] Freeing SMP alternatives memory: 44K
0.153664] x86/mm: Memory block size: 128MB
0.279224] Non-volatile memory driver v1.3
0.518714] Freeing initrd memory: 31828K
0.606951] Freeing unused decrypted memory: 2036K
0.607380] Freeing unused kernel image (initmem) memory: 2872K
0.607799] Freeing unused kernel image (text/rodata gap) memory: 2036K
0.608048] Freeing unused kernel image (rodata/data gap) memory: 1900K
1.063218] [TTFM] Zone kernel: Available graphics memory: 2004138 KiB
1.063276] [drm] Max dedicated hypervisor surface memory is 507904 KiB
1.063276] [drm] Maximum display memory size is 16384 KiB
eaalmazova@fedora ~]$ dmesg | grep -i "Hypervisor"
0.000000] Hypervisor detected: KVM
1.063276] [drm] Max dedicated hypervisor surface memory is 507904 KiB
eaalmazova@fedora ~]$ dmesg | grep -i "root"
0.000000] Command line: BOOT_IMAGE=(hd0,msdos1)/vmlinuz-5.14.10-300.fc35.x86_64 root=UUID=b2e66a95-4097-4bea-8abe-4a391edf1b9b ro rootflags=subvol=root
hgb quiet
0.015120] Kernel command line: BOOT_IMAGE=(hd0,msdos1)/vmlinuz-5.14.10-300.fc35.x86_64 root=UUID=b2e66a95-4097-4bea-8abe-4a391edf1b9b ro rootflags=subvo
=root rhgb quiet
0.217908] ACPI: PCI Root Bridge [PCI0] (domain 0000 [bus 00-ff])
0.218181] pci_bus 0000:00: root bus resource [io 0x0000-0x0cf7 window]
0.218182] pci_bus 0000:00: root bus resource [io 0x0d00-0xffff window]
0.218182] pci_bus 0000:00: root bus resource [mem 0x000a0000-0x000bffff window]
0.218183] pci_bus 0000:00: root bus resource [mem 0xe0000000-0xdfffffff window]
0.218184] pci_bus 0000:00: root bus resource [bus 00-ff]
0.253455] Trying to unpack rootfs image as initramfs...
4.384281] systemd[1]: initrd-switch-root.service: Deactivated successfully.
4.384351] systemd[1]: Stopped Switch Root.
4.385620] systemd[1]: Stopped target Switch Root.
4.385656] systemd[1]: Stopped target Initrd Root File System.
4.413950] systemd[1]: plymouth-switch-root.service: Deactivated successfully.
4.413981] systemd[1]: Stopped Plymouth switch root service.
4.414113] systemd[1]: systemd-fsck-root.service: Deactivated successfully.
4.414131] systemd[1]: Stopped File System Check on Root Device.
```

eaalmazova [Работает] - Oracle VM VirtualBox

Файл Машина Вид Ввод Устройства Справка

Activities Terminal Apr 22 16:01 en

```
eaalmazova@fedora:~$  
[ 0.011894] PM: hibernation: Registered nosave memory: [mem 0xfee01000-0xffffbfff]  
[ 0.011895] PM: hibernation: Registered nosave memory: [mem 0xffffc000-0xffffffff]  
[ 0.027481] Memory: 3967300K/4193848K available (16393K kernel code, 3531K rwdata, 10388K rodata, 2872K init, 4908K bss, 226288K reserved, 0K cma-reserved)  
  
[ 0.051335] Freeing SMP alternatives memory: 44K  
[ 0.153664] x86/mm: Memory block size: 128MB  
[ 0.279224] Non-volatile memory driver v1.3  
[ 0.518714] Freeing initrd memory: 31828K  
[ 0.606951] Freeing unused decrypted memory: 2036K  
[ 0.607380] Freeing unused kernel image (initmem) memory: 2872K  
[ 0.607799] Freeing unused kernel image (text/rodata gap) memory: 2036K  
[ 0.608048] Freeing unused kernel image (rodata/data gap) memory: 1900K  
[ 1.063218] [TTM] Zone kernel: Available graphics memory: 2004138 KiB  
[ 1.063276] [drm] Max dedicated hypervisor surface memory is 507904 KiB  
[ 1.063276] [drm] Maximum display memory size is 16384 KiB  
eaalmazova@fedora ~]$ dmesg | grep -i "Hypervisor"  
[ 0.000000] Hypervisor detected: KVM  
[ 1.063276] [drm] Max dedicated hypervisor surface memory is 507904 KiB  
eaalmazova@fedora ~]$ dmesg | grep -i "root"  
[ 0.000000] Command line: BOOT_IMAGE=(hd0,msdos1)/vmlinuz-5.14.10-300.fc35.x86_64 root=UUID=b2e66a95-4097-4bea-8abe-4a391edf1b9b ro rootflags=subvol=root  
rhgb quiet  
[ 0.015120] Kernel command line: BOOT_IMAGE=(hd0,msdos1)/vmlinuz-5.14.10-300.fc35.x86_64 root=UUID=b2e66a95-4097-4bea-8abe-4a391edf1b9b ro rootflags=subvol=root  
=root rhgb quiet  
[ 0.217908] ACPI: PCI Root Bridge [PCI0] (domain 0000 [bus 00-ff])  
[ 0.218181] pci_bus 0000:00: root bus resource [io 0x0000-0x0cf7 window]  
[ 0.218182] pci_bus 0000:00: root bus resource [io 0x0d00-0xffff window]  
[ 0.218182] pci_bus 0000:00: root bus resource [mem 0x000a0000-0x000bffff window]  
[ 0.218183] pci_bus 0000:00: root bus resource [mem 0xe0000000-0xfdf00000 window]  
[ 0.218184] pci_bus 0000:00: root bus resource [bus 00-ff]  
[ 0.253455] Trying to unpack rootfs image as initramfs...  
[ 4.384281] systemd[1]: initrd-switch-root.service: Deactivated successfully.  
[ 4.384351] systemd[1]: Stopped Switch Root.  
[ 4.385620] systemd[1]: Stopped target Switch Root.  
[ 4.385656] systemd[1]: Stopped target Initrd Root File System.  
[ 4.413950] systemd[1]: plymouth-switch-root.service: Deactivated successfully.  
[ 4.413981] systemd[1]: Stopped Plymouth switch root service.  
[ 4.414113] systemd[1]: systemd-fsck-root.service: Deactivated successfully.  
[ 4.414131] systemd[1]: Stopped File System Check on Root Device.  
[ 4.418208] systemd[1]: Starting Remount Root and Kernel File Systems...  
[ 4.418252] systemd[1]: Condition check resulted in Repartition Root Disk being skipped.  
[ 4.467963] systemd[1]: Finished Remount Root and Kernel File Systems.  
29.980265] Proxy window=12582913, root window=1310 ...  
eaalmazova@fedora ~]$ dmesg | grep -i "File system"  
[ 0.675464] systemd[1]: Reached target Initrd /usr File System.  
[ 0.675482] systemd[1]: Reached target Local File Systems.  
[ 4.385571] systemd[1]: Set up automount Arbitrary Executable File Formats File System Automount Point.  
[ 4.385631] systemd[1]: Stopped target Initrd File Systems.  
[ 4.385656] systemd[1]: Stopped target Initrd Root File System.  
[ 4.402147] systemd[1]: Mounting Huge Pages File System...  
[ 4.402656] systemd[1]: Mounting POSIX Message Queue File System...  
[ 4.403106] systemd[1]: Mounting Kernel Debug File System...  
[ 4.403527] systemd[1]: Mounting Kernel Trace File System...  
[ 4.414131] systemd[1]: Stopped File System Check on Root Device.  
[ 4.418208] systemd[1]: Starting Remount Root and Kernel File Systems...  
[ 4.424733] systemd[1]: Mounting FUSE Control File System...  
[ 4.425192] systemd[1]: Mounting Kernel Configuration File System...  
[ 4.425615] systemd[1]: Mounted Huge Pages File System.  
[ 4.425723] systemd[1]: Mounted POSIX Message Queue File System.  
[ 4.425776] systemd[1]: Mounted Kernel Debug File System.  
[ 4.425820] systemd[1]: Mounted Kernel Trace File System.  
[ 4.426757] systemd[1]: Mounted FUSE Control File System.  
[ 4.427664] systemd[1]: Mounted Kernel Configuration File System.  
[ 4.467963] systemd[1]: Finished Remount Root and Kernel File Systems.  
eaalmazova@fedora ~]$
```

Activities Terminal Apr 22 23:36 en

eaalmazova@fedora:~

```
[eaalmazova@fedora ~]$ dmesg | grep -i "mount"
[ 0.173904] Mount-cache hash table entries: 8192 (order: 4, 65536 bytes, linear)
[ 0.173911] Mountpoint-cache hash table entries: 8192 (order: 4, 65536 bytes, linear)
[ 4.853868] systemd[1]: Set up automount Arbitrary Executable File Formats File System Automount Point.
[ 4.862884] systemd[1]: Mounting Huge Pages File System...
[ 4.863504] systemd[1]: Mounting POSIX Message Queue File System...
[ 4.866928] systemd[1]: Mounting Kernel Debug File System...
[ 4.867474] systemd[1]: Mounting Kernel Trace File System...
[ 4.899649] systemd[1]: Starting Remount Root and Kernel File Systems...
[ 4.901521] systemd[1]: Mounted Huge Pages File System.
[ 4.901714] systemd[1]: Mounted POSIX Message Queue File System.
[ 4.901784] systemd[1]: Mounted Kernel Debug File System.
[ 4.901841] systemd[1]: Mounted Kernel Trace File System.
[ 4.903411] systemd[1]: Mounting FUSE Control File System...
[ 4.904163] systemd[1]: Mounting Kernel Configuration File System...
[ 4.906118] systemd[1]: Mounted FUSE Control File System.
[ 4.906300] systemd[1]: Mounted Kernel Configuration File System.
[ 4.963575] systemd[1]: Finished Remount Root and Kernel File Systems.
[ 4.963707] systemd[1]: Condition check resulted in OSTree Remount OS/ Bind Mounts being skipped.
[ 6.972035] EXT4-fs (sda1): mounted filesystem with ordered data mode. Opts: (null). Quota mode: none.
```



Спасибо за внимание!