

Лабораторная работа №11

Управление загрузкой системы

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Цель работы:

- Целью данной работы является получение навыков работы с загрузчиком системы GRUB2.

Модификация параметров GRUB2

Открытие файла grub

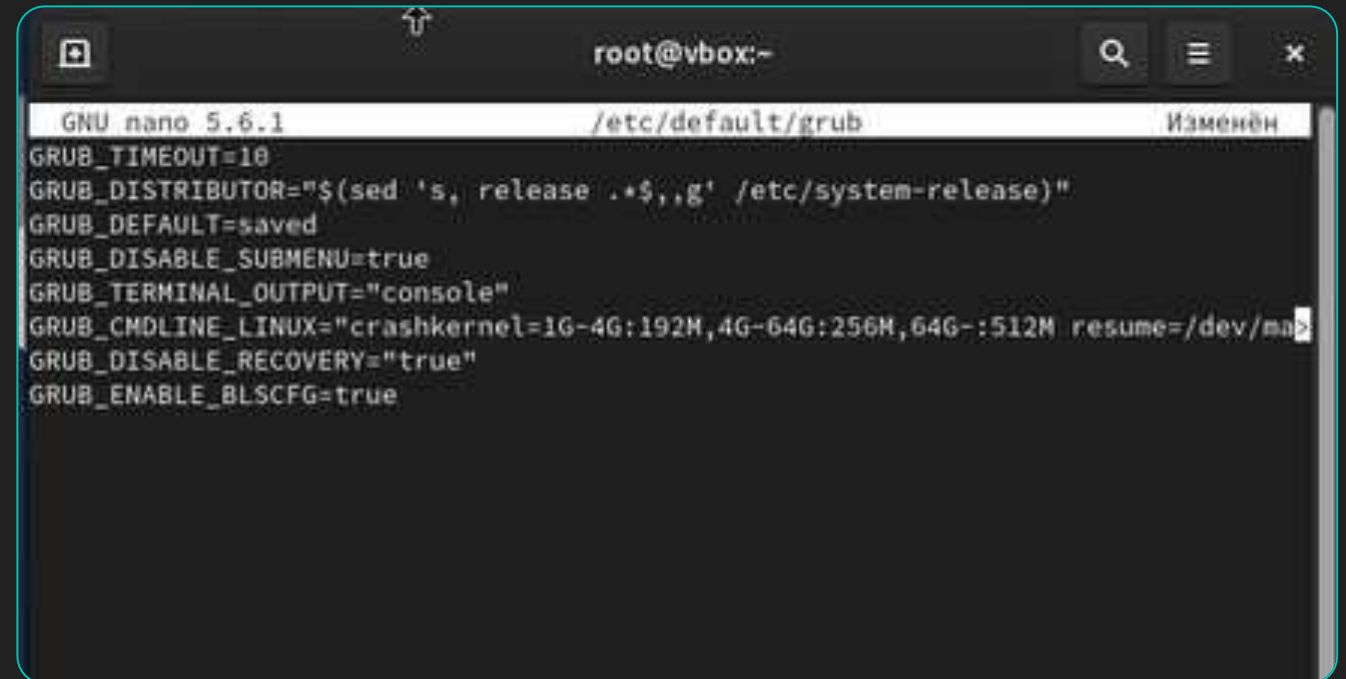


```
root@vbox:~  
[agko@vbox ~]$ su -  
Пароль:  
[root@vbox ~]# nano /etc/default/grub
```

Рис. 1.1. Запуск терминала и получение полномочий администратора, открытие файла в текстовом редакторе vim.

Редактирование файла grub

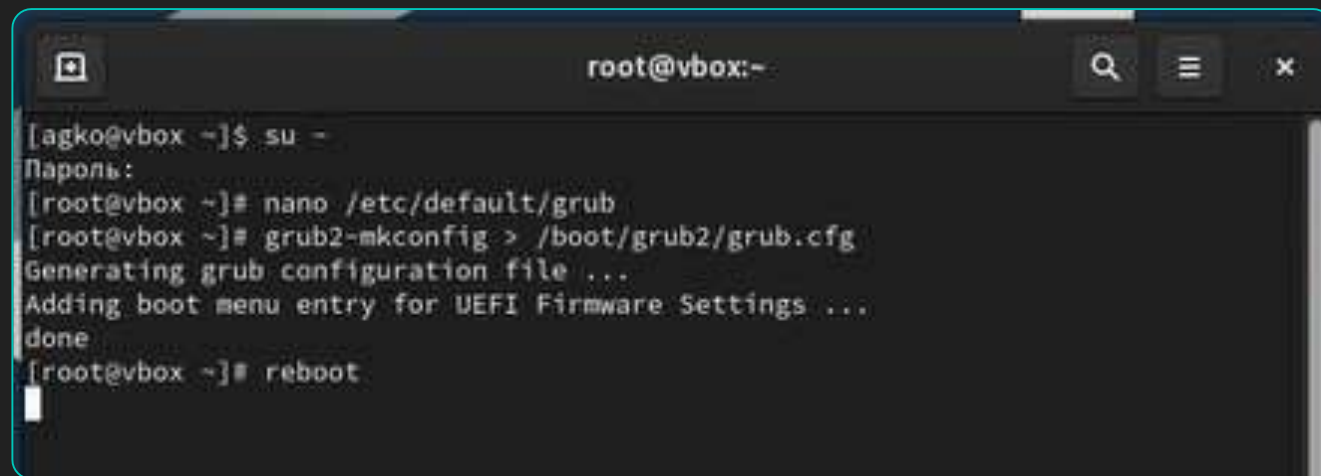
○Рис. 1.2. Удаление в файле параметров rhgb и quiet из строки указания параметров запуска ядра системы, установка параметра отображения меню загрузки в течение 10 секунд, сохранение и закрытие файла.



```
root@vbox:~  
GNU nano 5.6.1 /etc/default/grub Изменён  
GRUB_TIMEOUT=10  
GRUB_DISTRIBUTOR="$(sed 's, release .*,g' /etc/system-release)"  
GRUB_DEFAULT=saved  
GRUB_DISABLE_SUBMENU=true  
GRUB_TERMINAL_OUTPUT="console"  
GRUB_CMDLINE_LINUX="crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M resume=/dev/mapper"   
GRUB_DISABLE_RECOVERY="true"  
GRUB_ENABLE_BLSCFG=true
```

Запись изменений

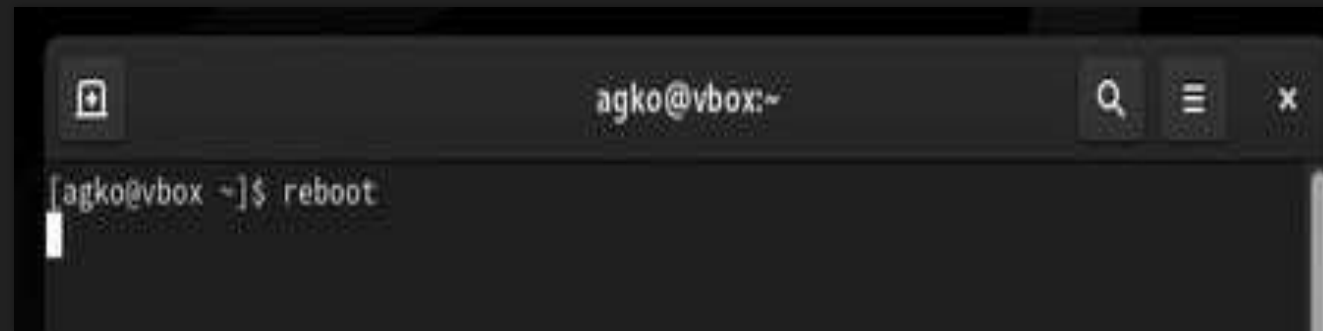
○Рис. 1.3. Запись изменений в GRUB2, перезагрузка системы.

A terminal window titled 'root@vbox:~' with search, menu, and close icons in the top right. The terminal shows a user switching to root, editing the GRUB configuration, regenerating it, and rebooting the system.

```
[agko@vbox ~]$ su -
Пароль:
[root@vbox ~]# nano /etc/default/grub
[root@vbox ~]# grub2-mkconfig > /boot/grub2/grub.cfg
Generating grub configuration file ...
Adding boot menu entry for UEFI Firmware Settings ...
done
[root@vbox ~]# reboot
```

Устранение неполадок

Перезагрузка системы

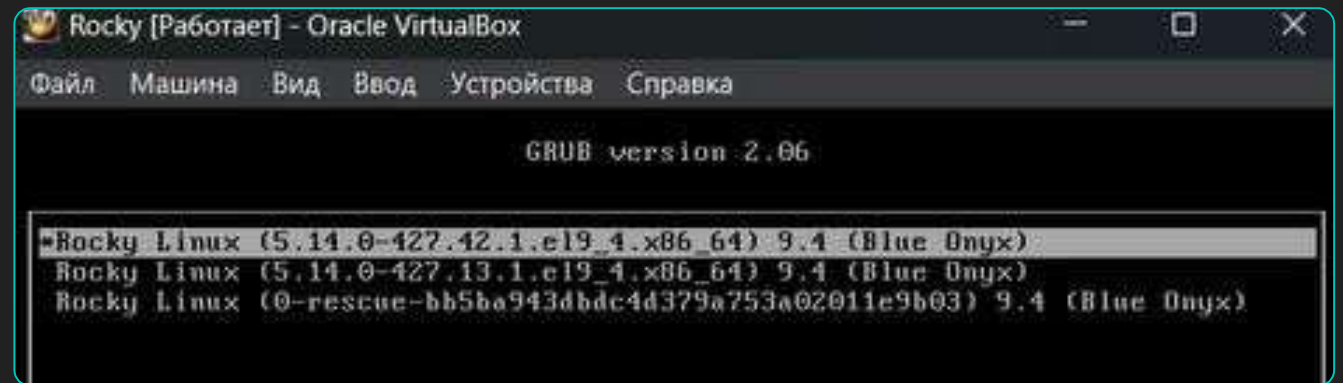
A screenshot of a terminal window with a dark background. The window title bar shows 'agko@vbox:~' and standard window controls. The terminal content shows the command '[agko@vbox ~]\$ reboot' with a white cursor at the end of the line.

```
[agko@vbox ~]$ reboot
```

Рис. 2.1. Запуск перезагрузки системы.

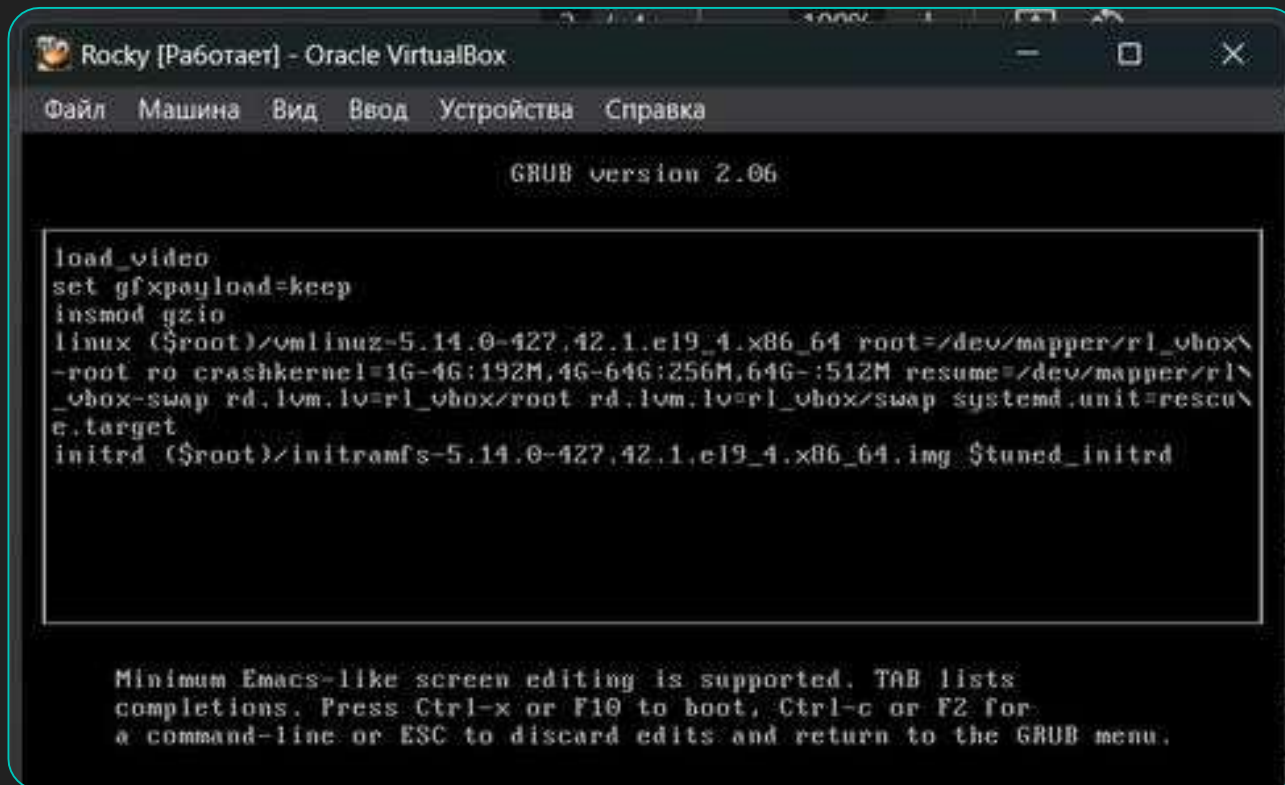
Выбор строки

○ **Рис. 2.2.** Выбор строки в меню GRUB с текущей версией ядра, редактирование.



Ввод в конце строки

○Рис. 2.3. Ввод в конце строки `linux ($root)/vmlinuz-systemd.unit=rescue.target`, продолжение процесса загрузки.



```
Rocky [Работает] - Oracle VirtualBox
Файл  Машина  Вид  Ввод  Устройства  Справка

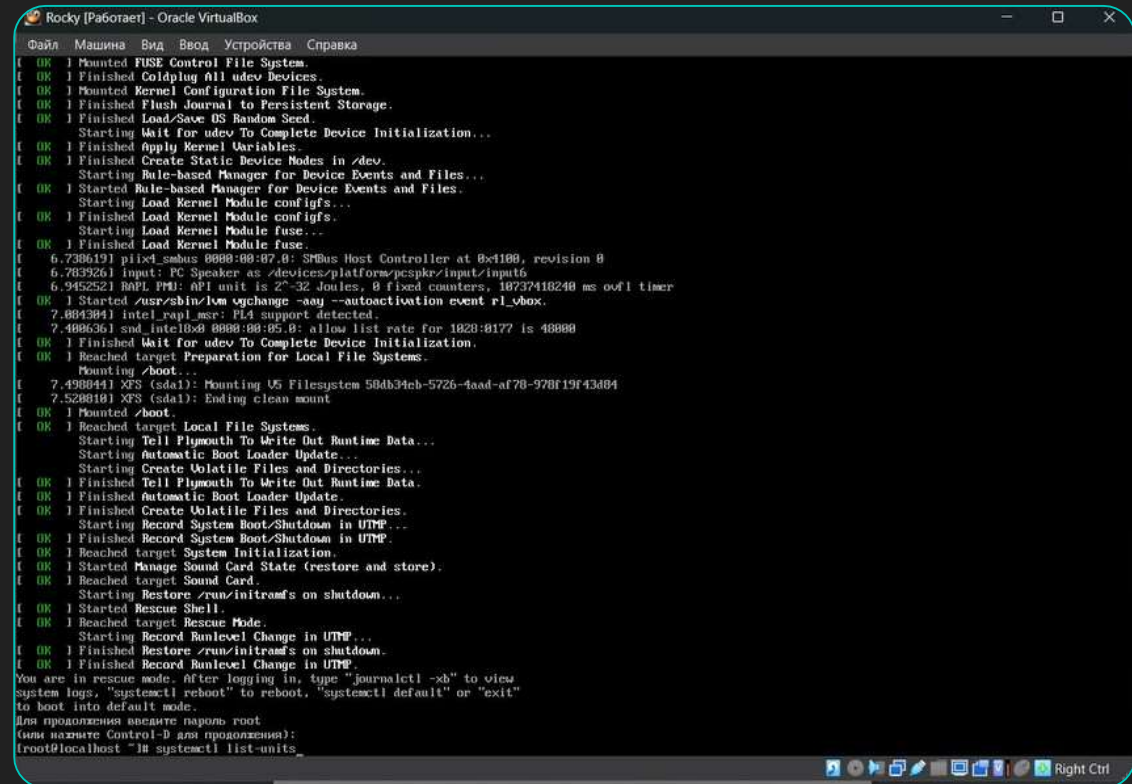
GRUB version 2.06

load_video
set gfxpayload=keep
insmod gzio
linux ($root)/vmlinuz-5.14.0-427.42.1.el9_4.x86_64 root=/dev/mapper/r1_vbox\
-root ro crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M resume=/dev/mapper/r1\
_vbox-swap rd.lvm.lv=r1_vbox/root rd.lvm.lv=r1_vbox/swap systemd.unit=rescu\
e.target
initrd ($root)/initramfs-5.14.0-427.42.1.el9_4.x86_64.img $tuned_initrd

Minimum Emacs-like screen editing is supported. TAB lists
completions. Press Ctrl-x or F10 to boot, Ctrl-c or F2 for
a command-line or ESC to discard edits and return to the GRUB menu.
```

Список всех файлов модулей

Орис. 2.4. Ввод пароль пользователя root. Просмотр списка всех файлов модулей, загруженных в настоящее время.



```
Rocky [Работает] - Oracle VM VirtualBox
Файл  Машина  Вид  Ввод  Устройства  Справка
[ OK ] Mounted FUSE Control File System.
[ OK ] Finished Coldplug All udev Devices.
[ OK ] Mounted Kernel Configuration File System.
[ OK ] Finished Flush Journal to Persistent Storage.
[ OK ] Finished Load/Save OS Random Seed.
[ OK ] Starting Wait for udev To Complete Device Initialization...
[ OK ] Finished Apply Kernel Variables.
[ OK ] Finished Create Static Device Nodes in /dev.
[ OK ] Starting Rule-based Manager for Device Events and Files...
[ OK ] Started Rule-based Manager for Device Events and Files.
[ OK ] Starting Load Kernel Module configs...
[ OK ] Finished Load Kernel Module configs...
[ OK ] Starting Load Kernel Module fuse...
[ OK ] Finished Load Kernel Module fuse.
[ 6.738619] piix4_smbus 8088:08:07:0: SMBus Host Controller at 8c4100, revision 0
[ 6.763926] input: PC Speaker as /devices/platform/pcspkr/input/input6
[ 6.945252] ACPI PMU: ACPI unit is 2^32 Joules, 0 fixed counters, 16737418240 ns ovfl timer
[ OK ] Started aspx-zshbin/om vchange --say --autoactivation event rl_vbox.
[ 7.804384] intel_rapl_rsr: F14 support detected.
[ 7.489636] snd_intel8x0 8088:08:05:0: allow list rate for 1828:8177 is 48000
[ OK ] Finished Wait for udev To Complete Device Initialization.
[ OK ] Reached target Preparation for Local File Systems.
[ OK ] Mounting /boot...
[ 7.498844] XFS (sda1): Mounting UFS Filesystem 50db34eb-5726-4aad-af78-970f19f43d04
[ 7.528818] XFS (sda1): Ending clean mount
[ OK ] Mounted /boot.
[ OK ] Reached target Local File Systems.
[ OK ] Starting Tell Plymouth To Write Out Runtime Data...
[ OK ] Starting Automatic Boot Loader Update...
[ OK ] Starting Create Volatile Files and Directories...
[ OK ] Finished Tell Plymouth To Write Out Runtime Data.
[ OK ] Finished Automatic Boot Loader Update.
[ OK ] Finished Create Volatile Files and Directories.
[ OK ] Starting Record System Boot/Shutdown in UTMP...
[ OK ] Finished Record System Boot/Shutdown in UTMP.
[ OK ] Reached target System Initialization.
[ OK ] Started Manage Sound Card State (restore and store).
[ OK ] Reached target Sound Card.
[ OK ] Starting Restore /run/initramfs on shutdown...
[ OK ] Started Rescue Shell.
[ OK ] Reached target Rescue Mode.
[ OK ] Starting Record Runlevel Change in UTMP...
[ OK ] Finished Restore /run/initramfs on shutdown.
[ OK ] Finished Record Runlevel Change in UTMP.
You are in rescue mode. After logging in, type "journalctl -xb" to view
system logs, "systemctl reboot" to reboot, "systemctl default" or "exit"
to boot into default mode.
Для продолжения введите пароль root
(или нажмите Control-D для продолжения):
[root@localhost ~]# systemctl list-units
```

Переменные среды оболочки

Орис. 2.5. Просмотр списка всех файлов модулей, загруженных в настоящее время. Просмотр задействованных переменных сред оболочки, перезагрузка системы.

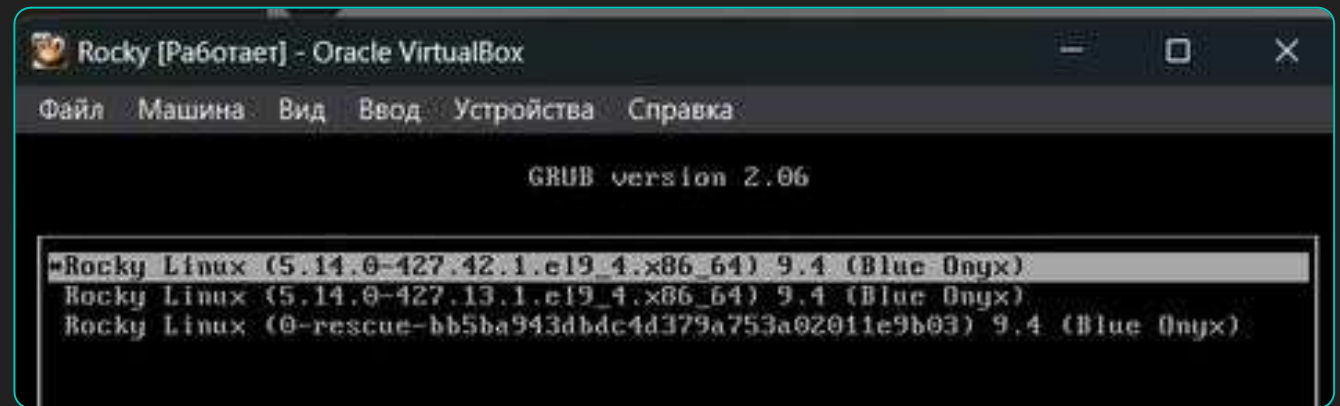
```
Rocky [Работает] - Oracle VirtualBox
Файл Машина Вид Ввод Устройства Справка

lvm2-monitor.service loaded active exited Monitoring of LVM2 mirrors, snapshots etc. us
nis-domainname.service loaded active exited Read and set NIS domainname from /etc/sysconf
plymouth-read-write.service loaded active exited Tell Plymouth To Write Out Runtime Data
plymouth-start.service loaded active exited Show Plymouth Boot Screen
rescue.service loaded active running Rescue Shell
systemd-boot-update.service loaded active exited Automatic Boot Loader Update
systemd-journal-flush.service loaded active exited Flush Journal to Persistent Storage
systemd-journald.service loaded active running Journal Service
systemd-modules-load.service loaded active exited Load Kernel Modules
systemd-network-generator.service loaded active exited Generate network units from Kernel command l
systemd-random-seed.service loaded active exited Load/Save OS Random Seed
systemd-remount-fs.service loaded active exited Remount Root and Kernel File Systems
systemd-sysctl.service loaded active exited Apply Kernel Variables
systemd-tmpfiles-setup-dev.service loaded active exited Create Static Device Nodes in /dev
systemd-tmpfiles-setup.service loaded active exited Create Volatile Files and Directories
systemd-udev-settle.service loaded active exited Wait for udev To Complete Device Initializat
systemd-udev-trigger.service loaded active exited Coldplug All udev Devices
systemd-udevd.service loaded active running Rule-based Manager for Device Events and Fil
systemd-update-ntp.service loaded active exited Record System Boot/Shutdown in UTMP
systemd-udev-setup.service loaded active exited Setup Virtual Console
systemd-udevd.service loaded active active Root Slice
systemd-udevd.service loaded active active Slice /system/modprobe
systemd-udevd.service loaded active active Slice /system/systemd-hibernate-resume
systemd-udevd.service loaded active active System Slice
systemd-udevd.service loaded active listening Device-mapper event daemon FIFOs
systemd-udevd.service loaded active listening LVM2 poll daemon socket
systemd-journald-dev-log.socket loaded active running Journal Socket (/dev/log)
systemd-journald.socket loaded active running Journal Socket
systemd-udev-control.socket loaded active running udev Control Socket
systemd-udev-kernel.socket loaded active running udev Kernel Socket
dev-mapper-r1_vboxxx2dswap.swap loaded active active /dev/mapper/r1_vboxxx2dswap
cryptsetup.target loaded active active Local Encrypted Volumes
integritysetup.target loaded active active Local Integrity Protected Volumes
local-fs-pre.target loaded active active Preparation for Local File Systems
local-fs.target loaded active active Local File Systems
network-pre.target loaded active active Preparation for Network
rescue.target loaded active active Rescue Mode
sound.target loaded active active Sound Card
swap.target loaded active active Swaps
sysinit.target loaded active active System Initialization
veritysetup.target loaded active active Local Verity Protected Volumes

LOAD = Reflects whether the unit definition was properly loaded.
ACTIVE = The high-level unit activation state, i.e. generalization of SUB.
SUB = The low-level unit activation state, values depend on unit type.
74 loaded units listed. Pass --all to see loaded but inactive units, too.
To show all installed unit files use 'systemctl list-unit-files'.
lines 83-81/81 (END)
Type: Ctrl+Alt+F1
log file: _
```

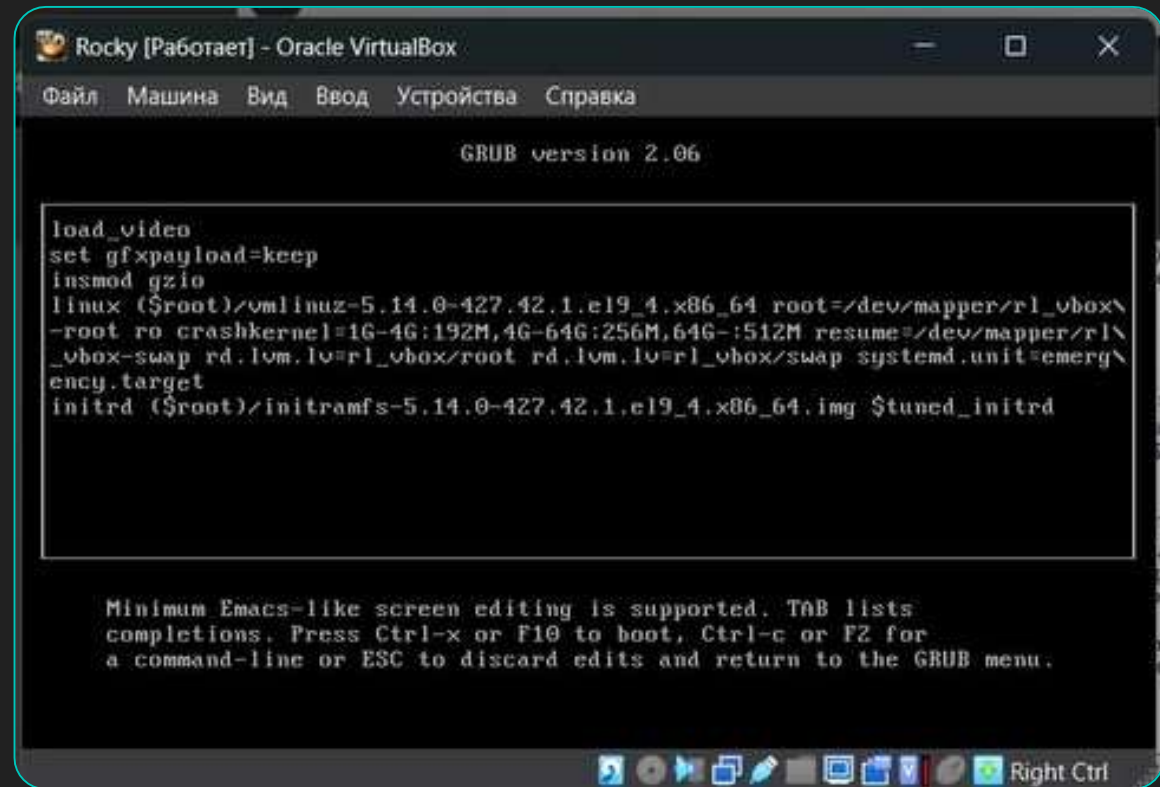
Повторный выбор строки

○ **Рис. 2.6.** Повторный выбор строки в меню GRUB с текущей версией ядра, редактирование.



Ввод в конце строки

○Рис. 2.7. Ввод в конце строки, загружающей ядро, systemd.unit=emergency.target и продолжение процесса загрузки.



Орис. 2.8. Ввод пароля пользователя root и просмотр списка всех загруженных файлов модулей.



Уменьшение кол-ва загружаемых файлов модулей

Орис. 2.9. Уменьшение до минимума количества загружаемых файлов модулей. Перегрузка системы.

```
Rocky [Работае] - Oracle VirtualBox
Файл Машина Вид Ввод Устройства Справка
dev-disk-by\x24id-ata\x24URDX_HARDDISK_UM7875end\x24bb0065fa\x24part2.device loaded activating tentative /dev/disk/by-id/ata-URDX_HARDDISK_UM7875
dev-disk-by\x24partuid-4eae7be1\x2401.device loaded activating tentative /dev/disk/by-partuid/4eae7be1-01
dev-disk-by\x24partuid-4eae7be1\x2402.device loaded activating tentative /dev/disk/by-partuid/4eae7be1-02
dev-disk-by\x24path-pci\x240000:00:04:0\x24ata\x241.0.device loaded activating tentative /dev/disk/by-path/pci-0000:00:04:0-ata-10
dev-disk-by\x24path-pci\x240000:00:04:0\x24ata\x241.0\x24part1.device loaded activating tentative /dev/disk/by-path/pci-0000:00:04:0-ata-10
dev-disk-by\x24path-pci\x240000:00:04:0\x24ata\x241.0\x24part2.device loaded activating tentative /dev/disk/by-path/pci-0000:00:04:0-ata-10
dev-disk-by\x24path-pci\x240000:00:04:0\x24ata\x241.device loaded activating tentative /dev/disk/by-path/pci-0000:00:04:0-ata-10
dev-disk-by\x24path-pci\x240000:00:04:0\x24ata\x241\x24part1.device loaded activating tentative /dev/disk/by-path/pci-0000:00:04:0-ata-10
dev-disk-by\x24path-pci\x240000:00:04:0\x24ata\x241\x24part2.device loaded activating tentative /dev/disk/by-path/pci-0000:00:04:0-ata-10
dev-disk-by\x24uid-50db34eb\x245726\x24aad\x24af70\x24970f19f43d04.device loaded activating tentative /dev/sda
dev-sda1.device loaded activating tentative /dev/sda1
dev-sda2.device loaded activating tentative /dev/sda2
dev-ttyS0.device loaded activating tentative /dev/ttyS0
dev-ttyS1.device loaded activating tentative /dev/ttyS1
dev-ttyS2.device loaded activating tentative /dev/ttyS2
dev-ttyS3.device loaded activating tentative /dev/ttyS3
sys-devices-pci0000:00:0000:00:03:0-net-ens3.device loaded activating tentative /sys/devices/pci0000:00:0000:00:03:0/net
sys-devices-pci0000:00:0000:00:04:0-ata3-host1-target1:0:0:0:0-block-sda-sda1.device loaded activating tentative /sys/devices/pci0000:00:0000:00:04:0/ata
sys-devices-pci0000:00:0000:00:04:0-ata3-host1-target1:0:0:0:0-block-sda-sda2.device loaded activating tentative /sys/devices/pci0000:00:0000:00:04:0/ata
sys-devices-platform-serial18250-tty-ttyS0.device loaded activating tentative /sys/devices/platform/serial18250/tty/tty
sys-devices-platform-serial18250-tty-ttyS1.device loaded activating tentative /sys/devices/platform/serial18250/tty/tty
sys-devices-platform-serial18250-tty-ttyS2.device loaded activating tentative /sys/devices/platform/serial18250/tty/tty
sys-devices-platform-serial18250-tty-ttyS3.device loaded activating tentative /sys/devices/platform/serial18250/tty/tty
sys-devices-virtual-block-dm\x2401.device loaded active plugged /sys/devices/virtual/block/dm-0
sys-module-configfs.device loaded activating tentative /sys/module/configfs
sys-module-fuse.device loaded activating tentative /sys/module/fuse
sys-subsystem-net-devices-ens3.device loaded activating tentative /sys/subsystem/net/devices/ens3
-.mount loaded active mounted Root Mount
init.scope loaded active running System and Service Manager
plymouth-start.service loaded active exited Show Plymouth Root Screen
systemd-journald.service loaded active running Journal Service
-.slice loaded active active Root Slice
system-system\x24hibernate\x24resume.slice loaded active active Slice /system/systemd-hibernate-resume
system.slice loaded active active System Slice
systemd-journald-dev-log.socket loaded active running Journal Socket (/dev/log)
systemd-journald.socket loaded active running Journal Socket
emergency.target loaded active active Emergency Mode

UNIT = Reflects whether the unit definition was properly loaded.
ACTIVE = The high-level unit activation state, i.e. generalization of SUB.
SUB = The low-level unit activation state, values depend on unit type.
# loaded units listed. Pass --all to see loaded but inactive units, too.
to show all installed unit files use 'systemctl list-unit-files'.
lines 9-51/51 (END)
[1] * Deamonen systemctl list-units
on file: systemctl reboot
```


Сброс пароля root

Перезагрузка системы

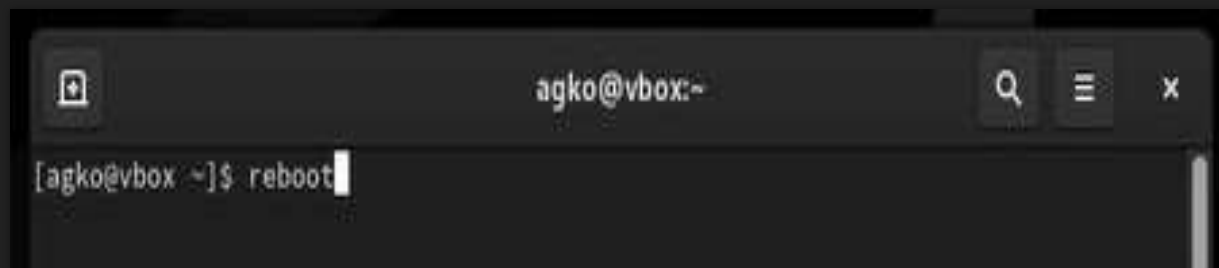
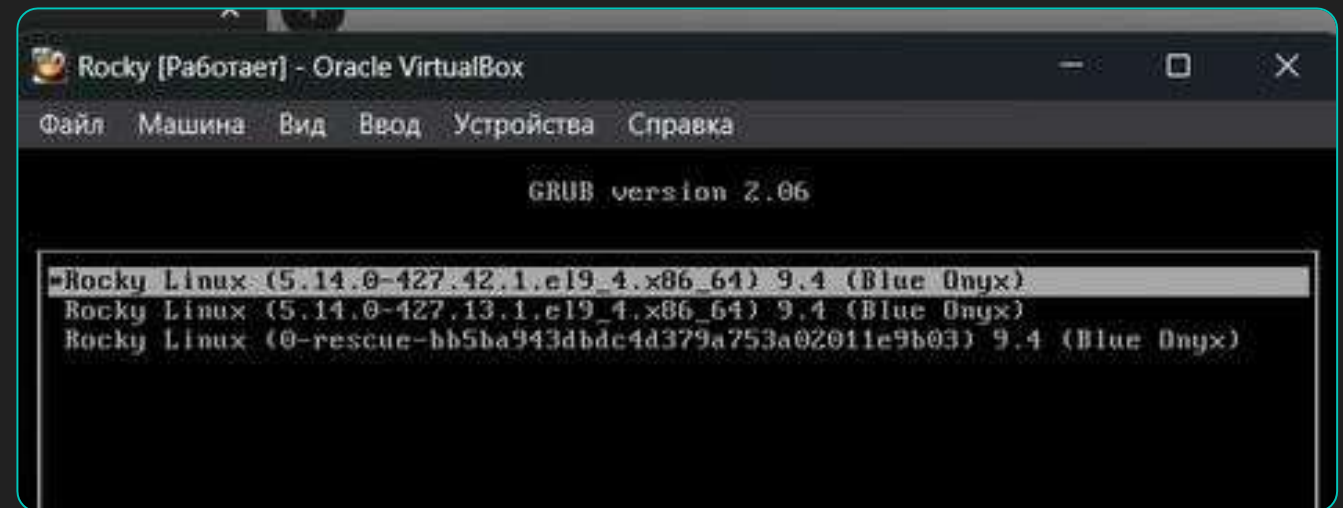


Рис. 3.1. Запуск перезагрузки системы.

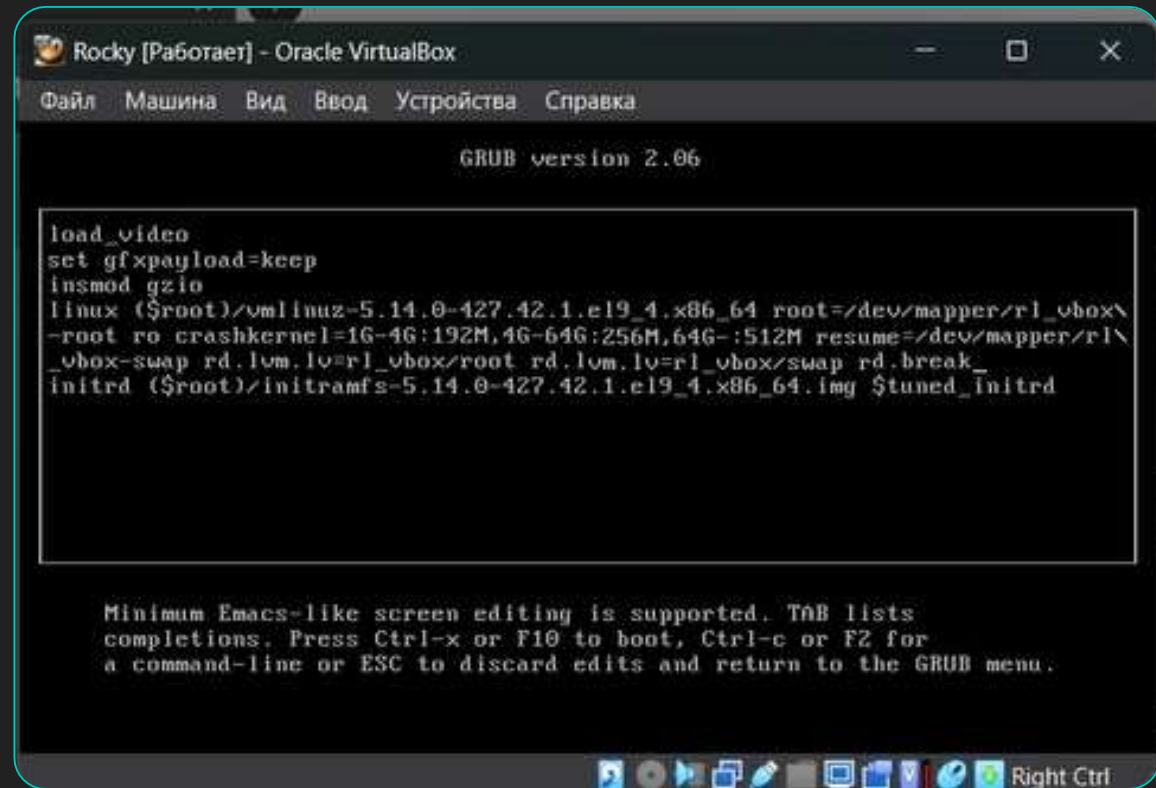
Повторный выбор строки

○ **Рис. 3.2.** Повторный выбор строки в меню GRUB с текущей версией ядра, редактирование.



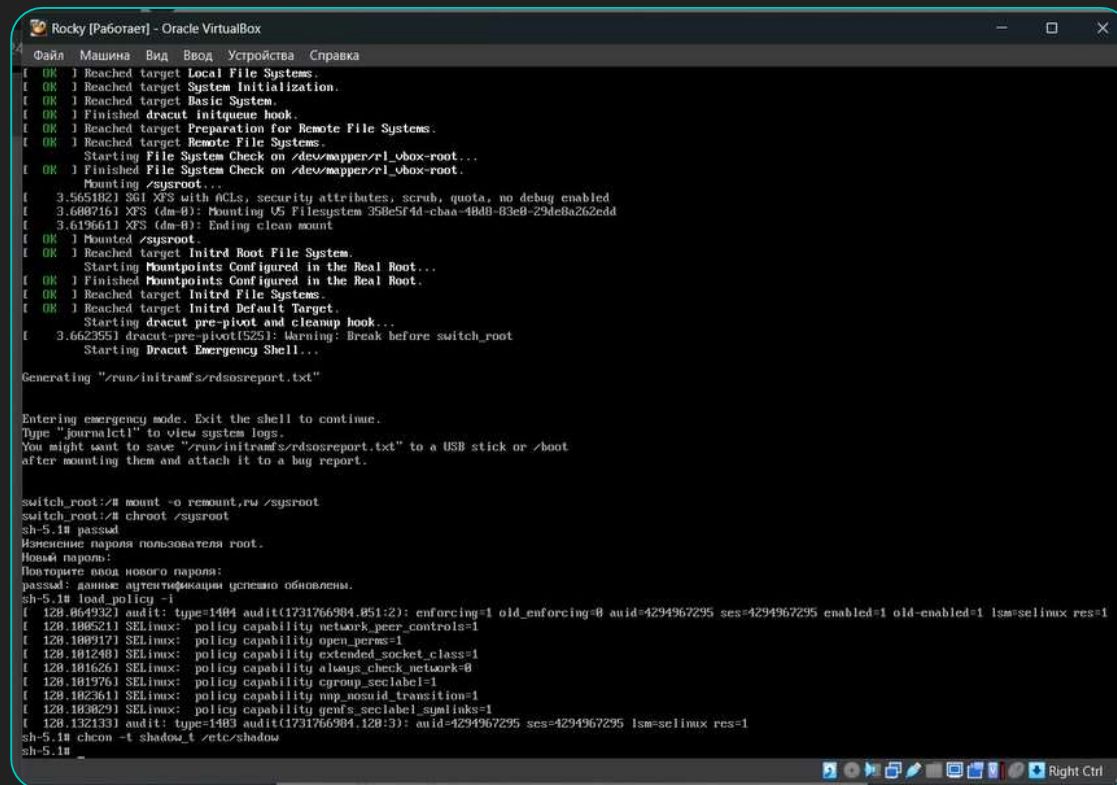
Ввод в конце строки

○ **Рис. 3.3.** Ввод в конце строки, загружающей ядро, `rd.break`, продолжение процесса загрузки..



Установка нового пароля для пользователя root

○Рис. 3.4. Получение доступа к системному образу для чтения и записи, делание содержимого каталога новым корневым каталогом, ввод команды задания пароля и установка нового пароля для пользователя root, загрузка политики SELinux, ручная установка правильного типа контекста.



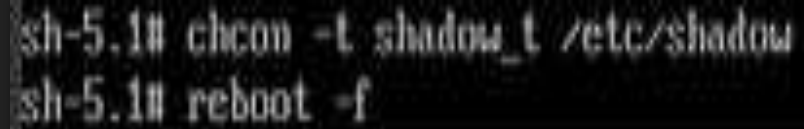
```
Rocky [Работаer] - Oracle VirtualBox
Файл  Машина  Вид  Ввод  Устройства  Справка
[ OK ] Reached target Local File Systems.
[ OK ] Reached target System Initialization.
[ OK ] Reached target Basic System.
[ OK ] Finished dracut initqueue hook.
[ OK ] Reached target Preparation for Remote File Systems.
[ OK ] Reached target Remote File Systems.
[ OK ] Starting File System Check on /dev/mapper/r1_vbox-root...
[ OK ] Finished File System Check on /dev/mapper/r1_vbox-root.
Mounting /sysroot...
[ 3.565182] SGI XFS with ACLs, security attributes, scrub, quota, no debug enabled
[ 3.688716] XFS (dm-0): Mounting FS Filesystem 358e5f4d-cbaa-48d8-83e8-29de8a262edd
[ 3.619611] XFS (dm-0): Ending clean mount
[ OK ] Mounted /sysroot.
[ OK ] Reached target Initrd Root File System.
Starting Mountpoints Configured in the Real Root...
[ OK ] Finished Mountpoints Configured in the Real Root.
[ OK ] Reached target Initrd File Systems.
[ OK ] Reached target Initrd Default Target.
Starting dracut pre-pivot and cleanup hook...
[ 3.662355] dracut-pre-pivot(1525): Warning: Break before switch_root
Starting Dracut Emergency Shell...

Generating "/run/initramfs/rdsosreport.txt"

Entering emergency mode. Exit the shell to continue.
Type "journalctl" to view system logs.
You might want to save "/run/initramfs/rdsosreport.txt" to a USB stick or /boot
after mounting them and attach it to a bug report.

switch_root:/# mount -o remount,rw /sysroot
switch_root:/# chroot /sysroot
sh-5.1# passwd
Изменение пароля пользователя root.
Новый пароль:
Повторите ввод нового пароля:
passwd: данные аутентификации успешно обновлены.
sh-5.1# load_policy -i
[ 128.864932] audit: type=1404 audit(1731766984.851:2): enforcing=1 old_enforcing=0 auid=4294967295 ses=4294967295 enabled=1 old-enabled=1 lsm=selinux res=1
[ 128.188521] SELinux: policy capability network_peer_controls=1
[ 128.188917] SELinux: policy capability open_perms=1
[ 128.181248] SELinux: policy capability extended_socket_class=1
[ 128.181626] SELinux: policy capability always_check_network=0
[ 128.181976] SELinux: policy capability cgroup_seclabel=1
[ 128.182361] SELinux: policy capability nnp_nosuid_transition=1
[ 128.183829] SELinux: policy capability genfs_seclabel_symlinks=1
[ 128.132133] audit: type=1403 audit(1731766984.128:3): auid=4294967295 ses=4294967295 lsm=selinux res=1
sh-5.1# chcon -t shadow_t /etc/shadow
sh-5.1#
```

Перезагрузка системы

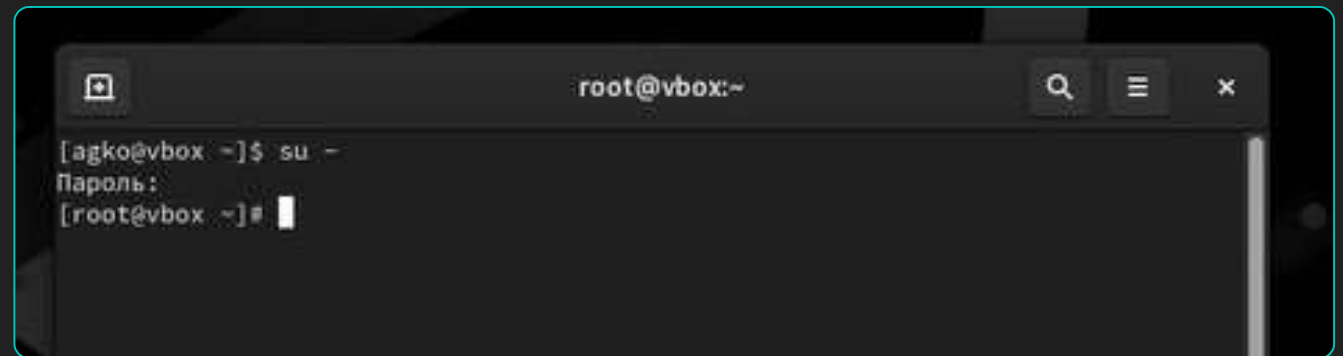
A terminal window with a black background and white text. It shows two commands entered at the prompt 'sh-5.1#'. The first command is 'chcon -t shadow_t /etc/shadow' and the second is 'reboot -f'.

```
sh-5.1# chcon -t shadow_t /etc/shadow
sh-5.1# reboot -f
```

Рис. 3.5. Перезагрузка системы.

Вход в систему

Орис. 3.6. Вход в систему с изменённым паролем для пользователя root.



ВЫВОД

- В ходе выполнения лабораторной работы были получены навыки работы с загрузчиком системы GRUB2.

Спасибо за внимание!