

# Лабораторная работа №11

## Управление загрузкой системы

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Акунаева Антонина Эрдниевна

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Российский университет дружбы народов, Москва, Россия

## Информация

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## Докладчик

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- Акунаева Антонина Эрдниевна
- студент ФФМиЕН, НПИбд-01-24
- Российский университет дружбы народов
- 1032240492@pfur.ru
- <https://github.com/Akuxee>



## Цели и задачи

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- Получить навыки работы с загрузчиком системы GRUB2.
1. Продемонстрируйте навыки по изменению параметров GRUB и записи изменений в файл конфигурации (см. раздел 11.4.1).
  2. Продемонстрируйте навыки устранения неполадок при работе с GRUB (см. раздел 11.4.2).
  3. Продемонстрируйте навыки работы с GRUB без использования root (см. раздел 11.4.3).

## Материалы и методы

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- Linux (дистрибутив Rocky 9.6)
- Linux Fedora Sway (Markdown)
- Oracle VirtualBox

## Выполнение лабораторной работы

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## Модификация параметров GRUB2

```
su -  
nano /etc/default/grub
```

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

## Параметр отображения меню загрузки в /etc/default/grub

GRUB\_TIMEOUT=10

```
| GNU nano 5.6.1                               /etc/default/grub
| 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="resume=/dev/mapper/rl-swap rd.lvm.lv=rl/root rd.lvm.lv=rl/s>
| GRUB_DISABLE_RECOVERY="true"
| GRUB_ENABLE_BLSCFG=true
```

[ Read 8 lines ]  
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location []  
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^\_ Go To Line

## Параметр запуска ядра системы GRUB2 в /etc/default/grub

```
| GNU nano 5.6.1          /etc/default/grub
| GRUB_TIMEOUT=10
| GRUB_DISTRIBUTOR="$(sed 's, release .*$,,g' /etc/system-release)"
| GRUB_DEFAULT=saved
| GRUB_DISABLE_SUBMENU=true
| GRUB_TERMINAL_OUTPUT="console"
| <v=rl/swap rhgb quiet"
| GRUB_DISABLE_RECOVERY="true"
| GRUB_ENABLE_BLSCFG=true
```

## Изменения скрытия загрузочных сообщений GRUB2 в /etc/default/grub

```
grub2-mkconfig > /boot/grub2/grub.cfg
```

```
GNU nano 5.6.1          /etc/default/grub          Modified
GRUB_TIMEOUT=10
GRUB_DISTRIBUTOR="$(sed 's, release .*$,,g' /etc/system-release)"
GRUB_DEFAULT=saved
GRUB_DISABLE_SUBMENU=true
GRUB_TERMINAL_OUTPUT="console"
<v=rl/swap"
GRUB_DISABLE_RECOVERY="true"
GRUB_ENABLE_BLSCFG=true
```

Save modified buffer?

Yes

No

Cancel

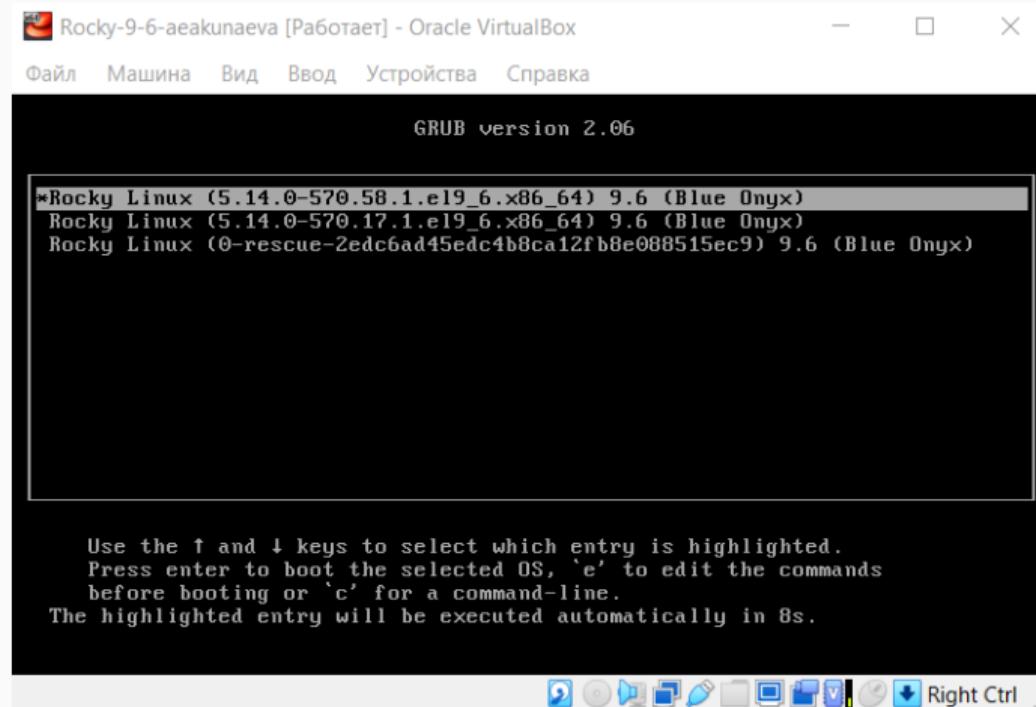
# Меню загрузочных сообщений GRUB2

```
[ OK ] Stopped target Socket Units.
[ OK ] Stopped target System Initialization.
[ OK ] Stopped target Local File Systems.
[ OK ] Stopped target Preparation for Local File Systems.
[ OK ] Stopped target Swap.
[ OK ] Stopped udev kernel message hook.
      Starting Plymouth switch root service...
[ OK ] Started Apply Kernel Variables.
[ OK ] Stopped Load Kernel Modules.
[ OK ] Stopped Create Volatile Files and Directories.
[ OK ] Stopped Cnfgd All udev Devices.
      Stopping Rule-based Manager for Device Events and Files...
[ OK ] Finished Cleaning Up and Shutting Down Daemons.
[ OK ] Stopped Rule-based Manager for Device Events and Files.
[ OK ] Closed udev Control Socket.
[ OK ] Closed udev Kernel Socket.
[ OK ] Stopped dracut pre-udev hook.
[ OK ] Stopped dracut cmln hook.
      Starting Cleanup udev Database...
[ OK ] Stopped Create Static Device Nodes in /dev.
[ OK ] Stopped Create List of Static Device Nodes.
[ OK ] Stopped System Create Users.
[ OK ] Reached Target Local State Database.
[ OK ] Reached Target Switch Root.
[ OK ] Finished Plymouth switch root service.
      Starting Switch Root.
4.9366311 systemd-journal[42471]: Received SIGTERM from PID 1 (systemd).
6.2319441 audit: type=1404 audit(1762567555.224:2): enforcing=1 old_enforcing=0 auid=429496295 ses=429496295 enabled=1 old_enabled=1 lsns=selinux res=1
6.5073801 SELinux: policy capability network_peer_controls=1
6.5080951 SELinux: policy capability open_perms=1
6.5098461 SELinux: policy capability extended_socket_class=1
6.5094321 SELinux: policy capability always_check_network=0
6.5097761 SELinux: policy capability cgroup_seclabel=1
6.5101261 SELinux: policy capability mmc_nosuid_transition=1
6.5104931 SELinux: policy capability genfs_seclabel_symlinks=1
6.6446261 audit: type=1403 audit(1762567555.680:3): auid=429496295 lsns=selinux res=1
6.6495591 systemd[1]: Successfully loaded SELinux policy in 431.79ms.
6.8187311 systemd[1]: labelled /dev/_devshm, /run, /sys/fs/cgroup in 36.27ms.
6.8534291 systemd[1]: systemd 252-51.e19.6.3-rocky.0.1 running in system mode (+PAM +AUDIT +SELINUX -APPARMOR +IMA +SMACK +SECOMP +CRYPT +GNUTLS +OPENSSL +ACPI +CPUSETS +CLOCKSOURCE +CRYPTO +KMOD +LIBCRYPTSETUP +LIBFDISK +PCIE2 -PAQUILTY +QRNGCODE +TMRQ +SCIF2 +L2LB -ZSTD -HPPC +MEMORIA +X86MMON +UTMP +SYSTEMD_DEFAULT_HIERARCHY +SELinux)
6.8566881 systemd[1]: Detected virtualization engine.
6.8596051 audit: type=1404 audit(1762567555.906:4): exec: denied ( read ) for pid=1 comm="system" name="exec" dev="/dev/tmpfs" ino=6 scontext=system_u:system_r:root_t tis=8 context=system_u:object_r:cpu_device_t:s0 class=chr_file permissive=0
6.8596091 systemd[1]: Detected architecture x86-64.
```

Welcome to **Rocky Linux 9.6 (Blue Distro)**

```
[ 7.302870] systemd-rc-local-generator[612]: /etc/rc.d/rc.local is not marked executable, skipping.
```

# Меню выбора версии ядра GRUB2



## Редактор GRUB2

GRUB version 2.06

```
load_video
set gfxpayload=keep
insmod gzio
linux ($root)/vmlinuz-5.14.0-570.58.1.el9_6.x86_64 root=/dev/mapper/r1-root
ro resume=/dev/mapper/r1-swap rd.lvm.lv=r1/root rd.lvm.lv=r1/swap rhgb quiet
crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M
initrd ($root)/initramfs-5.14.0-570.58.1.el9_6.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.

## Изменение опций запуска ядра системы на режим rescue

systemd.unit=rescue.target

```
GRUB version 2.06

load_video
set gfxpayload=keep
insmod gzio
linux ($root)/vmlinuz-5.14.0-570.58.1.el9_6.x86_64 root=/dev/mapper/r1-root\
    ro resume=/dev/mapper/r1-swap rd.lvm.lv=r1/root rd.lvm.lv=r1/swap crashker\
    nel=1G-4G:192M,4G-64G:256M,64G-:512M systemd.unit=rescue.target
initrd ($root)/initramfs-5.14.0-570.58.1.el9_6.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.
```

# Просмотр модулей и переменных в режиме восстановления GRUB2

```
systemctl list-units
```

```
systemctl show-environment
```

```
systemctl reboot
```

```
sys-devices-pci0000:00-0000:00:00:00-sound-card0-control0.device loaded active plugged /sys/devices/pci0000:00-0000:00:00:00-sound/c
sys-devices-pci0000:00-0000:00:00:00-ata3-host1-target1:0:0:0-block-sda-sda1.device loaded active plugged UBDX_HARDDISK 1
sys-devices-pci0000:00-0000:00:00:00-ata3-host1-target1:0:0:0-block-sda-sda2.device loaded active plugged UBDX_HARDDISK 2
sys-devices-pci0000:00-0000:00:00:00-ata3-host1-target1:0:0:0-block-sda.device loaded active plugged /sys/devices/pci0000:00-0000:00:00:00-ata3-host1-target1:0:0:0-block-sda
sys-devices-platform-serial0-tty-ttyp0.device loaded active plugged /sys/devices/platform/serial0-tty/ttyp0
sys-devices-platform-serial0-tty-ttyp1.device loaded active plugged /sys/devices/platform/serial0-tty/ttyp1
sys-devices-platform-serial0-tty-ttyp2.device loaded active plugged /sys/devices/platform/serial0-tty/ttyp2
sys-devices-platform-serial0-tty-ttyp3.device loaded active plugged /sys/devices/platform/serial0-tty/ttyp3
sys-devices-virtual-block-dm@0.device loaded active plugged /sys/devices/virtual/block/dm-0
sys-devices-virtual-block-dm@1.device loaded active plugged /sys/devices/virtual/block/dm-1
sys-module-configs.device sys-module-fuse.device sys-subsystem-net-devices-emp0s3.device 82540PM Gigabit Ethernet Controller (PRO1000M)
- .mount boot.mount loaded active mounted Root Mount
boot.mount loaded active mounted /boot
dev-hugepages.mount huge Pages File System
dev-mqueue.mount POSIX Message Queue File System
run-credentials@.mount /run/credentials/systemd-svc@.service.mount
run-credential@.mount /run/credentials/systemd-tmpfiles-setup.service.mount
run-credential@.mount /run/credentials/systemd-tmpfiles-setup-dev.service.mount
sys-fs-fuse-connections.mount fuse Control File System
sys-kernel-config.mount Kernel Configuration File System
sys-kernel-debug.mount Kernel Debug File System
sys-kernel-tracing.mount Kernel Trace File System
systemd-ask-password-plymouth.path Forward Password Requests to Plymouth Direct
init.scope System and Service Manager
alsa-state.service Manage Sound Card State (restore and store)
dracut-shutdown.service Restore /run/initramfs on shutdown
kmod-static-nodes.service Create List of Static Device Nodes
lvm2-monitor.service Monitoring of LVM2 mirrors, snapshots etc. u
nis-domainname.service Read and set NIS domainname from /etc/sysconf
plymouth-read-write.service Tell Plymouth To Write Out Runtime Data
plymouth-start.service Show Plymouth Boot Screen
rescue.service Rescue Shell
systemd-apply-update.service Perform Automatic Boot Loader Update
systemd-journal-flush.service Flush Journal to Persistent Storage
systemd-journald.service Journal Service
systemd-modules-load.service Load Kernel Modules
systemd-network-generator.service Generate network units from Kernel command l
systemd-random-seed.service Load/Save OS Random Seed
systemd-remount-fs.service Remount Root and Kernel File Systems
systemd-syntel.service Apply Kernel Variables
systemd-tmpfiles-setup-dev.service Create Static Device Nodes in /dev
systemd-tmpfiles-setup.service Create Volatile Files and Directories
systemd-udev-settle.service Wait for udev To Complete Device Initializ
*X
root@eakunacuva ~# systemctl show-environment
LANG=en_US.UTF-8
PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin
root@eakunacuva ~# systemctl reboot
13/19
```

# Изменение опций запуска ядра системы на режим emergency

systemd.unit=emergency.target

```
GRUB version 2.06

load_video
set gfxpayload=keep
insmod gzio
linux ($root)/vmlinuz-5.14.0-570.58.1.el9_6.x86_64 root=/dev/mapper/r1-root\
ro resume=/dev/mapper/r1-swap rd.lvm.lv=r1/root rd.lvm.lv=r1/swap crashker\
nel=1G-4G:192M,4G-64G:256M,64G-:512M systemd.unit=emergency.target_
initrd ($root)/initramfs-5.14.0-570.58.1.el9_6.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.
```

# Просмотр модулей в режиме мин. кол-ва системных единиц GRUB2

```
systemctl list-units
```

```
systemctl reboot
```

Unit	Status	Activating Since	SubUnits	
dev-disk-byz2ddisksig-1.device	loaded	activating	tentative	/dev/disk/by-disksig/1
dev-disk-byz2ddid-atax2d0BXH-HARDDISK_UBe68d05b2x2d4c69c5db.device	loaded	activating	tentative	/dev/disk/by-id/ata-0BXH_HARDDISK_UBe68d05b2x2d4c69c5db
dev-disk-byz2ddid-atax2d0BXH-HARDDISK_UBe68d05b2x2d4c69c5dbx2dpart1.device	loaded	activating	tentative	/dev/disk/by-id/ata-0BXH_HARDDISK_UBe68d05b2x2d4c69c5dbx2dpart1
dev-disk-byz2ddid-atax2d0BXH-UBe68d05b2x2d4c69c5dbx2dpart2.device	loaded	activating	tentative	/dev/disk/by-id/ata-0BXH_UBe68d05b2x2d4c69c5dbx2dpart2
dev-disk-byz2ddpartuid-9d648253x2d01.device	loaded	activating	tentative	/dev/disk/by-partuid/9d648253x2d01
dev-disk-byz2ddpartuid-9d648253x2d02.device	loaded	activating	tentative	/dev/disk/by-partuid/9d648253x2d02
dev-disk-byz2ddpth-pciN2x2d0000-00-0d_0x2zdatax2d1_0.device	loaded	activating	tentative	/dev/disk/by-path/pci-0000-00-0d_0x2zdatax2d1_0
dev-disk-byz2ddpth-pciN2x2d0000-00-0d_0x2zdatax2d1_0x2zpart1.device	loaded	activating	tentative	/dev/disk/by-path/pci-0000-00-0d_0x2zdatax2d1_0x2zpart1
dev-disk-byz2ddpth-pciN2x2d0000-00-0d_0x2zdatax2d1_0x2zpart2.device	loaded	activating	tentative	/dev/disk/by-path/pci-0000-00-0d_0x2zdatax2d1_0x2zpart2
dev-disk-byz2ddpth-pciN2x2d0000-00-0d_0x2zdatax2d1.device	loaded	activating	tentative	/dev/disk/by-path/pci-0000-00-0d_0x2zdatax2d1
dev-disk-byz2ddpth-pciN2x2d0000-00-0d_0x2zdatax2d1x2dpart1.device	loaded	activating	tentative	/dev/disk/by-path/pci-0000-00-0d_0x2zdatax2d1x2dpart1
dev-disk-byz2ddpth-pciN2x2d0000-00-0d_0x2zdatax2d1x2dpart2.device	loaded	activating	tentative	/dev/disk/by-path/pci-0000-00-0d_0x2zdatax2d1x2dpart2
dev-disk-byz2duuid-5ca0ef14x2d95d2x2d4a90x2d4b7f7x2d407ce94f232d.device	loaded	activating	tentative	/dev/disk/by-uuid/5ca0ef14x2d95d2x2d4a90x2d4b7f7x2d407ce94f232d
dev-sda.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-pci0000:00-0000:00-00:0d_0-ata3-host1-target1:0:0-0:0-block-sda-sda1.device	loaded	activating	tentative	/sys/devices/pci0000:00-0000:00-00:0d_0-ata3-host1-target1:0:0-0:0-block-sda-sda1
sys-devices-pci0000:00-0000:00-00:0d_0-ata3-host1-target1:0:0-0:0-block-sda-sda2.device	loaded	activating	tentative	/sys/devices/pci0000:00-0000:00-00:0d_0-ata3-host1-target1:0:0-0:0-block-sda-sda2
sys-devices-pci0000:00-0000:00-00:0d_0-ata3-host1-target1:0:0-0:0-block-sda.device	loaded	activating	tentative	/sys/devices/pci0000:00-0000:00-00:0d_0-ata3-host1-target1:0:0-0:0-block-sda
sys-devices-platform-serial0-tty-ttys0.device	loaded	activating	tentative	/sys/devices/platform-serial0-tty-ttys0
sys-devices-platform-serial0-tty-ttys1.device	loaded	activating	tentative	/sys/devices/platform-serial0-tty-ttys1
sys-devices-platform-serial0-tty-ttys2.device	loaded	activating	tentative	/sys/devices/platform-serial0-tty-ttys2
sys-devices-platform-serial0-tty-ttys3.device	loaded	activating	tentative	/sys/devices/platform-serial0-tty-ttys3
sys-devices-virtual-block-dmz2d0.device	loaded	active	plugged	/sys/devices/virtual/block-dmz2d0
sys-devices-virtual-block-dmz2d1.device	loaded	active	plugged	/sys/devices/virtual/block-dmz2d1
sys-module-configs.device	loaded	activating	tentative	/sys/module/configs
sys-module-fuse.device	loaded	activating	tentative	/sys/module/fuse
sys-subsystem-net-devices-empuls3.device	loaded	activating	tentative	/sys/subsystem/net/devices-empuls3
-mount	loaded	active	mounted	Root Mount
init.scope	loaded	active	running	System and Service Manager
emergency.service	loaded	active	running	Emergency Shell
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-systemd\x2dhibernate\x2dresume.slice	loaded	active	active	slice /system\x2dhibernate\x2dresume
system.slice	loaded	active	active	System Slice
systemd-journal-log.socket	loaded	active	running	Journal Socket (/dev/log)
systemd-journal.socket	loaded	active	running	Journal Socket
emergency.target	loaded	active	active	Emergency Node

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.

root@acakanasaw ~# systemctl reboot

# Добавление опции rd.break в редакторе GRUB2

## rd.break

```
GRUB version 2.06

load_video
set gfxpayload=keep
insmod gzio
linux ($root)/vmlinuz-5.14.0-570.58.1.e19_6.x86_64 root=/dev/mapper/r1-root\
ro resume=/dev/mapper/r1-swap rd.lvm.lv=r1/root rd.lvm.lv=r1/swap crashker\
nel=1G-4G:192M,4G-64G:256M,64G-:512M rd.break
initrd ($root)/initramfs-5.14.0-570.58.1.e19_6.x86_64.img $tuned_initrd

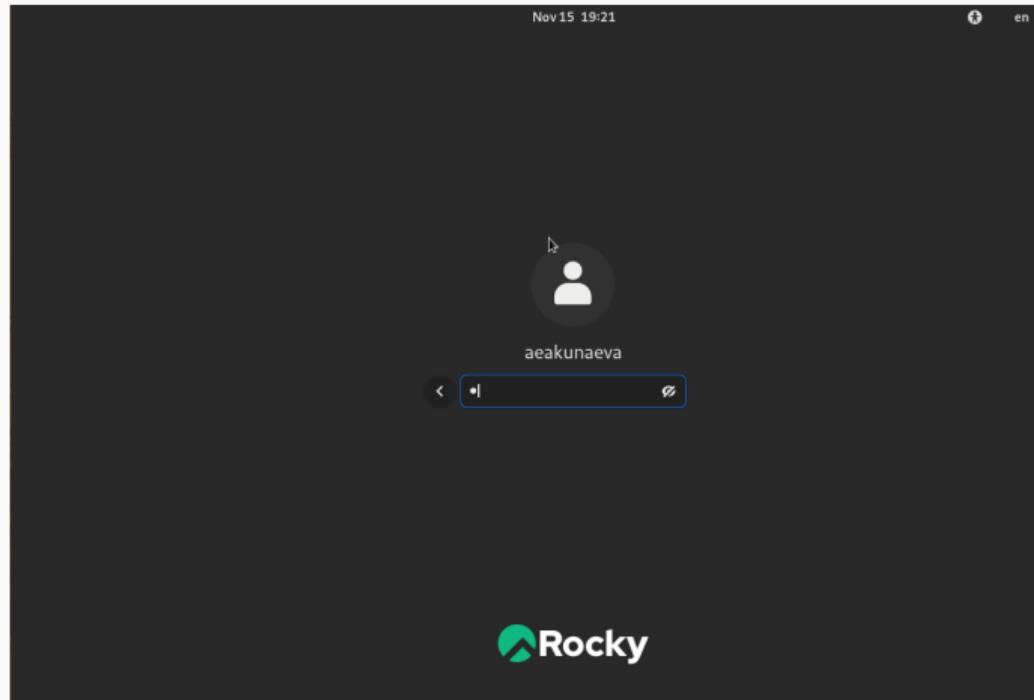
Minimum Emacs-like screen editing is supported. TAB lists
completions. Press Ctrl-x or F10 to boot, Ctrl-c or F2 for
a command-line or ESC to discard edits and return to the GRUB menu.
```

# Сброс пароля root

```
mount -o remount,rw /sysroot  
chroot /sysroot  
passwd  
chcon -t shadow_t /etc/shadow  
reboot -f
```

```
[ 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...  
[ 5.821279] dracut-pre-pivot(568): 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  
sh: passwd: command not found  
sh-5.1# passwd  
Changing password for user root.  
New password:  
Retype new password:  
and PMSM0: The password is a palindrome  
Retype new password:  
passwd: all authentication tokens updated successfully.  
sh-5.1# load_policy -i  
[ 152.991436] audit: type=1404 audit(1763223542.976:2): enforcing=1 old_enforcing=0 auid=4294967295 ses=4294967295 enabled=1 old_enabled=1 lsnsel  
[ 153.145298] SELinux: policy capability network_peer_controls=1  
[ 153.145839] SELinux: policy capability open_perms=1  
[ 153.146216] SELinux: policy capability extended_socket_class=1  
[ 153.146598] SELinux: policy capability always_check_network=0  
[ 153.146925] SELinux: policy capability cgroup_seclabel=1  
[ 153.147231] SELinux: policy capability mpm_nosuid_transition=1  
[ 153.147567] SELinux: policy capability genfs_seclabel_symlinks=1  
[ 153.271622] audit: type=1403 audit(1763223542.959:3): auid=4294967295 ses=4294967295 lsns=selinux res=1  
sh-5.1# chcon -t shadow_t /etc/shadow  
sh-5.1# reboot -f
```

## Вход под новым паролем



## Выводы

---

## Выводы

---

Я получила навыки работы с загрузчиком системы GRUB2.