

# Лабораторная работа №11

Управление загрузкой системы

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## Цель работы

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Получение навыков работы с загрузчиком **GRUB2** в операционной системе Linux.

## Ход выполнения работы

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# Изменение конфигурации GRUB2



```
mtursunov@mtursunov:/home/mtursunov - nano /etc/default/grub
GNU nano 8.1 /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"
GRUB_CMDLINE_LINUX="resume=UUID=2b15f0da-ec83-45cf-94b8-04fe12c60ecd rd.lvm.lv=rl_vbox/root rd.lvm.lv=r"
GRUB_DISABLE_RECOVERY="true"
GRUB_ENABLE_BLSCFG=true
```

Рис. 1: Редактирование файла /etc/default/grub



Рис. 2: Меню загрузчика GRUB

## Вход в режим восстановления (rescue)

```
GRUB version 2.12

load_video
set gfxpayload=keep
insmod gzio
linux ($root)/vmlinuz-6.12.0-55.39.1.el10_0.x86_64 root=/dev/mapper/rl_vbox\
-root ro resume=UUID=2b15f0da-ec83-45cf-94b8-04fe12c60ecd rd.lvm.lv=rl_vbox\
/root rd.lvm.lv=rl_vbox/swap systemd.unit=rescue.target
initrd ($root)/initramfs-6.12.0-55.39.1.el10_0.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.
```

Рис. 3: Редактирование параметров загрузки (режим rescue)

```
~.slice                                loaded active active    Root Slice
system-modprobe.slice                 loaded active active    Slice /system/modprobe
system.slice                           loaded active active    System Slice
dm-event.socket                       loaded active listening  Device-mapper event daemon FIFOs
lvm2-lvmpolld.socket                  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 Sockets
systemd-udevd-control.socket            loaded active running   udev Control Socket
systemd-udevd-kernel.socket             loaded active running   udev Kernel Socket
dev-disk-by\x2duuid-2b15f8da\x24ec83\x2445cf\x2494b8\x2404fc12c6bcd.swap loaded active active    /dev/disk/by-uuid/2b15f8da-ec83-45cf-94b8-
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

Legend: 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.

89 loaded units listed. Pass --all to see loaded but inactive units, too.
To show all installed unit files use 'systemctl list-unit-files'.
root@elarsunov:~# systemctl show-environment
LANG=en_US.UTF-8
PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin
XDG_DATA_DIRS=/var/lib/flatpak/exports/share:/usr/local/share:/usr/share/
root@elarsunov:~#
```

Рис. 4: Вывод systemctl list-units в режиме rescue



# Проверка переменных среды

```
~.slice                                loaded active active    Root Slice
system-modprobe.slice                 loaded active active    Slice /system/modprobe
system.slice                           loaded active active    System Slice
dm-event.socket                       loaded active listening  Device-mapper event daemon FIFOs
lvm2-lvmpld.socket                    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 Sockets
systemd-udevd-control.socket           loaded active running   udev Control Socket
systemd-udevd-kernel.socket            loaded active running   udev Kernel Socket
dev-disk-by\x2duuid-2b15f8da\x24ec83\x2445cf\x2494b8\x2404fc12c6bcd.swap loaded active active    /dev/disk/by-uuid/2b15f8da-ec83-45cf-94b8-
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

Legend: 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.

89 loaded units listed. Pass --all to see loaded but inactive units, too.
To show all installed unit files use 'systemctl list-unit-files'.
root@elarsunov:~# systemctl show-environment
LANG=en_US.UTF-8
PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin
XDG_DATA_DIRS=/var/lib/flatpak/exports/share:/usr/local/share:/usr/share/
root@elarsunov:~#
```

Рис. 5: Переменные среды systemctl show-environment

## Переход в аварийный режим (emergency)

```
GRUB version 2.12

load_video
set gfxpayload=keep
insmod gzio
linux ($root)/vmlinuz-6.12.0-55.39.1.el10_0.x86_64 root=/dev/mapper/rl_vbox\
-root ro resume=UUID=2b15f0da-ec83-45cf-94b8-04fe12c60ecd rd.lvm.lv=rl_vbox\
/root rd.lvm.lv=rl_vbox/swap systemd.unit=emergency.target
initrd ($root)/initramfs-6.12.0-55.39.1.el10_0.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.
```

Рис. 6: Редактирование параметров загрузки (режим emergency)

```
• sys-devices-pci0000:00-0000:00:0d.0-ata3-host2-target2:0:0-2:0:0:0-block-sda-sda1.device loaded activating tentat
• sys-devices-pci0000:00-0000:00:0d.0-ata3-host2-target2:0:0-2:0:0:0-block-sda-sda2.device loaded activating tentat
• sys-devices-pci0000:00-0000:00:0d.0-ata3-host2-target2:0:0-2:0:0:0-block-sda-sda3.device loaded activating tentat
• sys-devices-pci0000:00-0000:00:0d.0-ata3-host2-target2:0:0-2:0:0:0-block-sda-sda4.device loaded activating tentat
• sys-devices-platform-serial18250:0-serial18250:0.0-tty-ty9S0.device loaded activating tentat
• sys-devices-platform-serial18250:0-serial18250:0.1-tty-ty9S1.device loaded activating tentat
• sys-devices-platform-serial18250:0-serial18250:0.2-tty-ty9S2.device loaded activating tentat
• sys-devices-platform-serial18250:0-serial18250:0.3-tty-ty9S3.device loaded activating tentat
• sys-devices-virtua1-block-dmxx240.device loaded active plugg
• sys-devices-virtua1-block-dmxx241.device loaded active plugg
• sys-module-configfs.device loaded activating tentat
• sys-module-fuse.device loaded activating tentat
- .mount loaded active mount
sys-kernel-config.mount loaded active mount
init.scope loaded active runini
emergency.service loaded active runini
plymouth-start.service loaded active exited
systemd-journald.service loaded active runini
- .slice loaded active active
system-modprobe.slice loaded active active
system.slice loaded active active
systemd-journald-dev-log.socket loaded active runini
systemd-journald.socket loaded active runini
emergency.target loaded active active

Legend: 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.

68 loaded units listed. Pass --all to see loaded but inactive units, too.
To show all installed unit files use 'systemctl list-unit-files'.
lines 28-76/76 (END)
```

Рис. 7: Вывод systemctl list-units в аварийном режиме

```
GRUB version 2.12

load_video
set gfxpayload=keep
insmod gzio
linux ($root)/vmlinuz-6.12.0-55.39.1.el10_0.x86_64 root=/dev/mapper/r1_vbox\
-root ro resume=UUID=2b15f0da-ec83-45cf-94b8-04fe12c60ecd rd.lvm.lv=r1_vbox\
/root rd.lvm.lv=r1_vbox/swap rd.break_
initrd ($root)/initramfs-6.12.0-55.39.1.el10_0.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.
```

Рис. 8: Загрузка с параметром rd.break

## Итоги работы

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В ходе лабораторной работы были изучены принципы управления загрузчиком **GRUB2**. Рассмотрены методы изменения конфигурации, настройка параметров загрузки, переход в режимы **rescue.target** и **emergency.target**, а также процесс восстановления пароля **root**. Полученные знания позволяют администратору эффективно управлять процессом загрузки и устранять ошибки при инициализации системы.