

# Отчёт по лабораторной работе №11

Управление загрузкой системы

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## Цель работы

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Получить навыки настройки загрузчика GRUB2, изменения параметров загрузки ядра и устранения неполадок системы через различные режимы загрузки.

## Выполнение лабораторной работы

---

```
grub [----] 0 L:[ 1+ 6 7/ 9] *(274 / 327b) 0071 0x047 [*][X]
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=3c0695d5-327b-4526-a357-1608fc50250f rd.lvm.lv=rl_vbox/root rd.lvm.lv=rl_vbox/swap"
GRUB_DISABLE_RECOVERY="true"
GRUB_ENABLE_BLSCFG=true
```

Рис. 1: Редактирование /etc/default/grub

```
dsyakovleva@dsyakovleva:~$ su
Password:
root@dsyakovleva:/home/dsyakovleva# mcedit /etc/default/grub

root@dsyakovleva:/home/dsyakovleva# grub2-mkconfig -o /boot/grub2/grub.cfg
Generating grub configuration file ...
Adding boot menu entry for UEFI Firmware Settings ...
done
root@dsyakovleva:/home/dsyakovleva# █
```

Рис. 2: Выполнение grub2-mkconfig

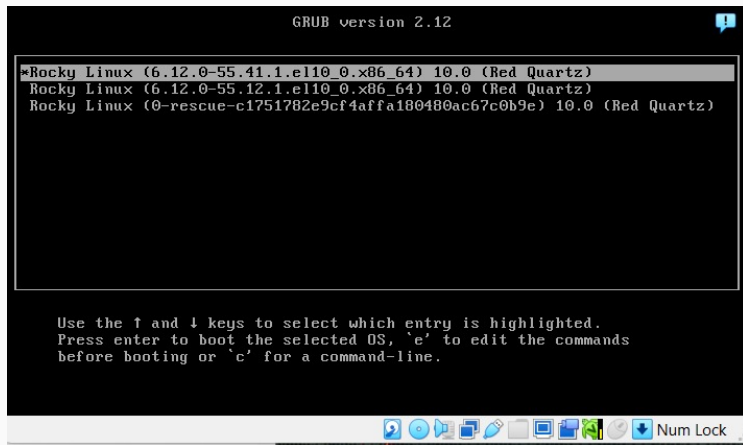


Рис. 3: Меню GRUB после изменений

```
load_video
set gfxpayload=keep
insmod gzio
linux ($root)/vmlinuz-6.12.0-55.41.1.el10_0.x86_64 root=/dev/mapper/rl_vbox\
-root ro resume=UUID=3c0695d5-327b-4526-a357-1608fc50250f rd.lvm.lv=rl_vbox\
/root rd.lvm.lv=rl_vbox/swap crashkernel=2G-64G:256M,64G-:512M systemd.unit\
=rescue.target_
initrd ($root)/initramfs-6.12.0-55.41.1.el10_0.x86_64.img $tuned_initrd
```

Рис. 4: Добавление параметра rescue.target



# Просмотр системных модулей и среды

```
boot.mount loaded active mounted /boot
dev-hugepages.mount loaded active mounted Huge Pages File System
dev-mqueue.mount loaded active mounted POSIX Message Queue File System
sys-fs-fuse-connections.mount loaded active mounted FUSE Control File System
sys-kernel-config.mount loaded active mounted Kernel Configuration File System
sys-kernel-debug.mount loaded active mounted Kernel Debug File System
sys-kernel-tracing.mount loaded active mounted Kernel Trace File System
systemd-ask-password-plymouth.path loaded active waiting Forward Password Requests to Plymouth Directory
init.scope loaded active running System and Service Manager
alsa-state.service loaded active running Manage Sound Card State (restore and store)
dracut-shutdown.service loaded active exited Restore /run/initramfs on shutdown
kmod-static-nodes.service loaded active exited Create List of Static Device Nodes
lvm2-monitor.service loaded active exited Monitoring of LVM2 mirrors, snapshots etc
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-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 line
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-early.service loaded active exited Create Static Device Nodes in /dev
systemd-tmpfiles-setup-dev.service loaded active exited Create Static Device Nodes in /dev
systemd-tmpfiles-setup.service loaded active exited Create System Files and Directories
systemd-udev-load-credentials.service loaded active exited Load udev Rules from Credentials
systemd-udev-trigger.service loaded active exited Coldplug All udev Devices
systemd-udev.service loaded active running Rule-based Manager for Device Events and Files
systemd-update-utmp.service loaded active exited Record System Boot/Shutdown in UTMP
root@msukhovleva:~# systemctl show-environment
ARGEN_US.UTF-8
PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin
DG_DATA_DIRS=/var/lib/flatpak/exports/share:/usr/local/share:/usr/share/
root@msukhovleva:~#
```

Рис. 5: Переменные среды



```
GRUB version 2.12

load_video
set gfxpayload=keep
insmod gzio
linux ($root)/vmlinuz-6.12.0-55.41.1.el10_0.x86_64 root=/dev/mapper/rl_vbox\
-root ro resume=UUID=3c0695d5-327b-4526-a357-1608fc50250f rd.lvm.lv=rl_vbox\
/root rd.lvm.lv=rl_vbox/swap crashkernel=2G-64G:256M,64G-:512M systemd.unit\
=emergency.target_
initrd ($root)/initramfs-6.12.0-55.41.1.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: emergency.target

# Минимальный набор модулей

UNIT	LOAD	ACTIVE	SUB
dev-cdrom.device	loaded	activating	tentat
dev-disk-by\x2didskseq-1.device	loaded	activating	tentat
dev-disk-by\x2didskseq-1\x2dpart1.device	loaded	activating	tentat
dev-disk-by\x2didskseq-1\x2dpart2.device	loaded	activating	tentat
dev-disk-by\x2didskseq-1\x2dpart3.device	loaded	activating	tentat
dev-disk-by\x2didskseq-3.device	loaded	activating	tentat
dev-disk-by\x2did-ata\x2dUBOX_CD\x2dROM_UB2\x2d81788376.device	loaded	activating	tentat
dev-disk-by\x2did-ata\x2dUBOX_HARDDISK_UB35ec9810\x2ddffed8a3.device	loaded	activating	tentat
dev-disk-by\x2did-ata\x2dUBOX_HARDDISK_UB35ec9810\x2ddffed8a3\x2dpart1.device	loaded	activating	tentat
dev-disk-by\x2did-ata\x2dUBOX_HARDDISK_UB35ec9810\x2ddffed8a3\x2dpart2.device	loaded	activating	tentat
dev-disk-by\x2did-ata\x2dUBOX_HARDDISK_UB35ec9810\x2ddffed8a3\x2dpart3.device	loaded	activating	tentat
dev-disk-by\x2did-l\x2dbox_00s_7.1.12.device	loaded	activating	tentat
dev-disk-by\x2dpartumid-2c10b2b1\x2d49616\x2d446e9\x2d4b8ea\x2d4661d8e149cef.device	loaded	activating	tentat
dev-disk-by\x2dpartumid-632cf68a\x2d44563\x2d244ce8\x2d4899b\x2d249c68d23365cd.device	loaded	activating	tentat
dev-disk-by\x2dpartumid-e2efc3ac\x2d44e2e\x2d444d4\x2d2a267\x2d4899f8f82a8792.device	loaded	activating	tentat
dev-disk-by\x2dpath-pci\x2d0000:00:01.1\x2data\x2d2.0.device	loaded	activating	tentat
dev-disk-by\x2dpath-pci\x2d0000:00:01.1\x2data\x2d2.0.device	loaded	activating	tentat
dev-disk-by\x2dpath-pci\x2d0000:00:0d.0\x2data\x2d1.0.device	loaded	activating	tentat
dev-disk-by\x2dpath-pci\x2d0000:00:0d.0\x2data\x2d1.0\x2dpart-by\x2dpartum-1.device	loaded	activating	tentat
dev-disk-by\x2dpath-pci\x2d0000:00:0d.0\x2data\x2d1.0\x2dpart-by\x2dpartum-2.device	loaded	activating	tentat
dev-disk-by\x2dpath-pci\x2d0000:00:0d.0\x2data\x2d1.0\x2dpart-by\x2dpartum-3.device	loaded	activating	tentat
dev-disk-by\x2dpath-pci\x2d0000:00:0d.0\x2data\x2d1.0\x2dpart-by\x2dpartumid-2c10b2b1\x2d49616\x2d446e9\x2d4b8ea\x2d4661d8e149cef.device	loaded	activating	tentat
dev-disk-by\x2dpath-pci\x2d0000:00:0d.0\x2data\x2d1.0\x2dpart-by\x2dpartumid-632cf68a\x2d44563\x2d244ce8\x2d4899b\x2d249c68d23365cd.device	loaded	activating	tentat
dev-disk-by\x2dpath-pci\x2d0000:00:0d.0\x2data\x2d1.0\x2dpart-by\x2dpartumid-62efc3ac\x2d44e2e\x2d444d4\x2d2a267\x2d4899f8f82a8792.device	loaded	activating	tentat
dev-disk-by\x2dpath-pci\x2d0000:00:0d.0\x2data\x2d1.0\x2dpart-by\x2dumid-de7872c8\x2da5f4\x2d445b1\x2d2b592\x2d48619ba3b8588.device	loaded	activating	tentat
dev-disk-by\x2dpath-pci\x2d0000:00:0d.0\x2data\x2d1.0\x2dpart1.device	loaded	activating	tentat
dev-disk-by\x2dpath-pci\x2d0000:00:0d.0\x2data\x2d1.0\x2dpart2.device	loaded	activating	tentat
dev-disk-by\x2dpath-pci\x2d0000:00:0d.0\x2data\x2d1.0\x2dpart3.device	loaded	activating	tentat
dev-disk-by\x2dpath-pci\x2d0000:00:0d.0\x2data\x2d1\x2dpart1.device	loaded	activating	tentat
dev-disk-by\x2dpath-pci\x2d0000:00:0d.0\x2data\x2d1\x2dpart2.device	loaded	activating	tentat
dev-disk-by\x2dpath-pci\x2d0000:00:0d.0\x2data\x2d1\x2dpart3.device	loaded	activating	tentat
dev-disk-by\x2dpath-pci\x2d0000:00:0d.0\x2data\x2d241\x2d2455.device	loaded	activating	tentat
dev-disk-by\x2dumid-de7872c8\x2da5f4\x2d445b1\x2d2b592\x2d48619ba3b8588.device	loaded	activating	tentat
dev-sda.device	loaded	activating	tentat
dev-sda1.device	loaded	activating	tentat
dev-sda2.device	loaded	activating	tentat
dev-sda3.device	loaded	activating	tentat
dev-sr0.device	loaded	activating	tentat
dev-ttyS0.device	loaded	activating	tentat
dev-ttyS1.device	loaded	activating	tentat
dev-ttyS2.device	loaded	activating	tentat
dev-ttyS3.device	loaded	activating	tentat
sys-devices-pci0000:00:0000:00:01.1-ata2-host1-target1:0:0-2:0:0:0-block-sr0.device	loaded	activating	tentat
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.device	loaded	activating	tentat

Рис. 7: Минимальные модули

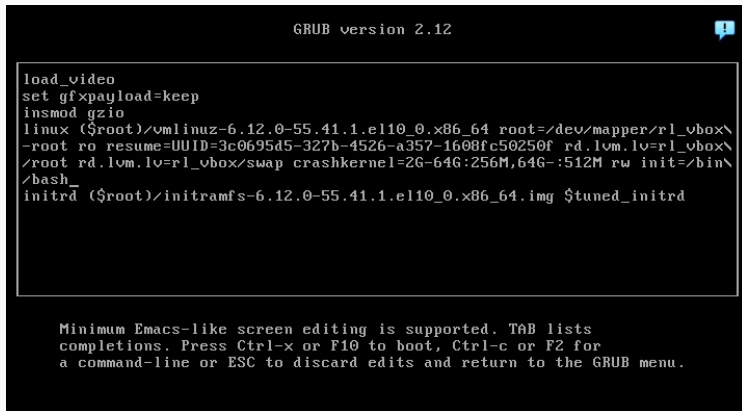
## Попытка сброса через rd.break (неудачно)

```
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.

Give root password for maintenance
(or press Control-D to continue):
sh-5.2# 1
sh: 1: command not found
sh-5.2# mount -o remount,rw /sysroot
sh-5.2# chroot /sysroot
sh: chroot: command not found
sh-5.2# passwd
sh: passwd: command not found
sh-5.2#
```

Рис. 8: Ошибки initramfs



The image shows a terminal window with a black background and white text. At the top, it says "GRUB version 2.12" followed by a small blue icon with an exclamation mark. Below this, a rectangular box contains a series of GRUB commands. After the box, there is a paragraph of text explaining basic editing features.

```
load_video
set gfxpayload=keep
insmod gzio
linux ($root)/vmlinuz-6.12.0-55.41.1.el10_0.x86_64 root=/dev/mapper/rl_vbox\
-root ro resume=UUID=3c0695d5-327b-4526-a357-1608fc50250f rd.lvm.lv=rl_vbox\
/root rd.lvm.lv=rl_vbox/swap crashkernel=2G-64G:256M,64G-:512M rw init=/bin\
/bash_
initrd ($root)/initramfs-6.12.0-55.41.1.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. 9: init=/bin/bash

```
bash-5.2# touch /.autorelabel
bash-5.2# passwd
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: password updated successfully
bash-5.2# exec /sbin/bash
bash: /sbin/bash: No such file or directory
bash-5.2# exec /sbin/init
```

Рис. 10: Смена пароля root

```
dsyakovleva@dsyakovleva:~$ su
Password:
su: Authentication failure
dsyakovleva@dsyakovleva:~$ su
Password:
root@dsyakovleva:/home/dsyakovleva#
```

Рис. 11: Аутентификация root

## Контрольные вопросы

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- `/etc/default/grub`
- `/boot/grub2/grub.cfg`

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

## Итоги работы

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В ходе работы были изучены методы настройки GRUB2, способы загрузки в режимы rescue и emergency, а также выполнен успешный сброс пароля root с использованием параметра `init=/bin/bash`. Получены навыки диагностики проблем загрузки и временной модификации параметров запуска ядра.