

Отчёт о лабораторной работе

Лабораторная работа 12. Управление загрузкой системы

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Содержание

1. Цель работы

Получить навыки работы с загрузчиком системы GRUB2.

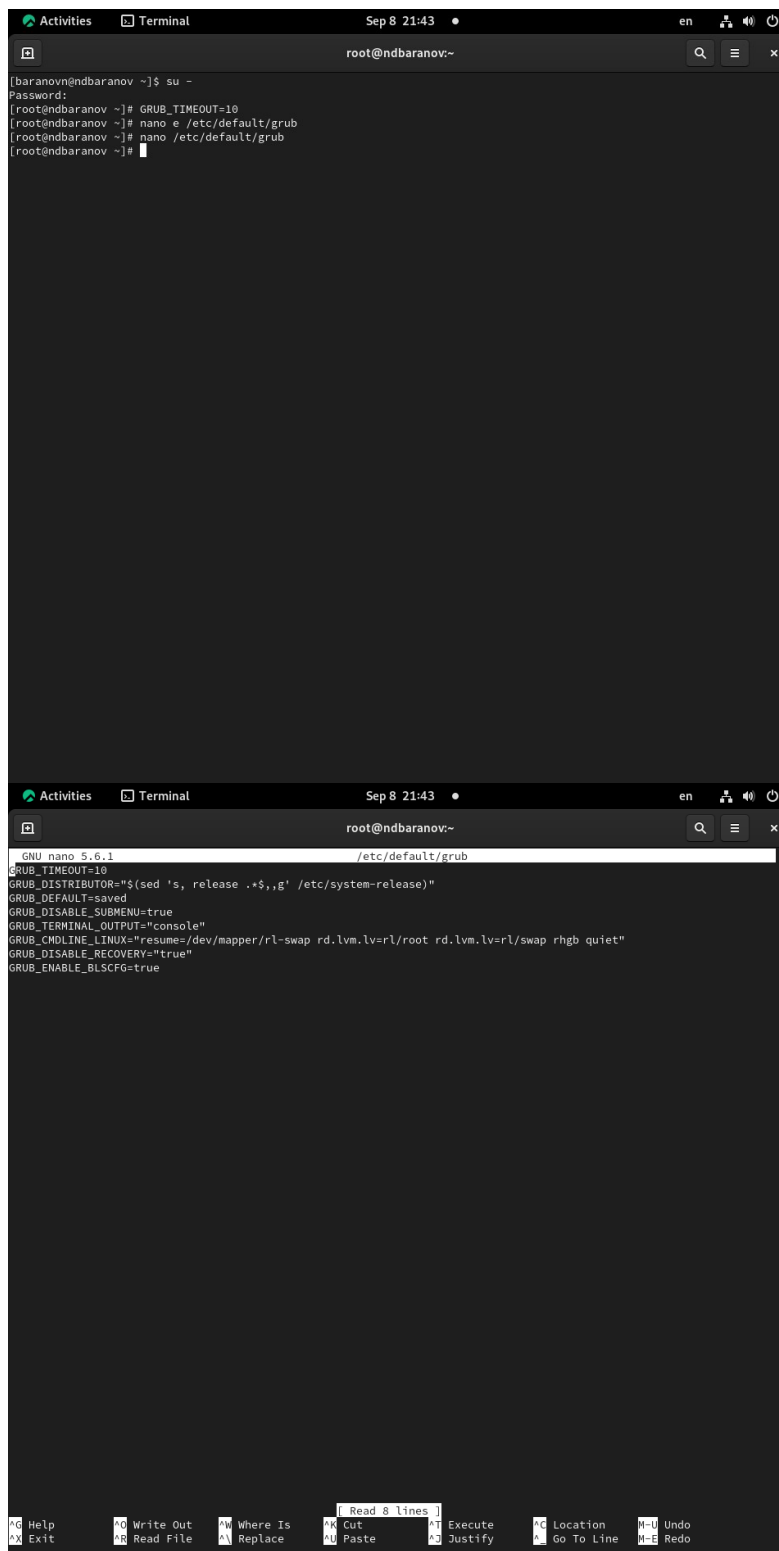
2. Задание

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).

3. Выполнение лабораторной работы

3.1 Настройка загрузчика GRUB2

Получаем полномочия администратора и редактируем конфигурационный файл GRUB (рис. [fig:001?], [fig:002?]).



```
[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# GRUB_TIMEOUT=10
[root@ndbaranov ~]# nano /etc/default/grub
[root@ndbaranov ~]# nano /etc/default/grub
[root@ndbaranov ~]#
```



```
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/swap rhgb quiet"
GRUB_DISABLE_RECOVERY="true"
GRUB_ENABLE_BLSCFG=true
```

Устанавливаем параметр `GRUB_TIMEOUT=10` для отображения меню загрузки в течение 10 секунд.

Применяем изменения конфигурации GRUB2 (рис. [fig:003?]).

```
Activities Terminal Sep 8 21:43 en
root@ndbaranov:~
[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# GRUB_TIMEOUT=10
[root@ndbaranov ~]# nano /etc/default/grub
[root@ndbaranov ~]# nano /etc/default/grub
[root@ndbaranov ~]# grub2-mkconfig > /boot/grub2/grub.cfg
Generating grub configuration file ...
Adding boot menu entry for UEFI Firmware Settings ...
done
[root@ndbaranov ~]#
```

Применение изменений GRUB2

После перезагрузки наблюдаем процесс загрузки с отображением загрузочных сообщений (рис. [fig:004?]).

```
GRUB version 2.06

load_video
set gfxpayload=keep
insmod gzio
linux ($root)/vmlinuz-5.14.0-570.37.1.el9_6.x86_64 root=/dev/mapper/rl-root\
ro resume=/dev/mapper/rl-swap rd.lvm.lv=rl/root rd.lvm.lv=rl/swap rhgb qui\
et crashkernel=16-4G:192M,4G-64G:256M,64G-:512M systemd.unit=rescue.target_\
initrd ($root)/initramfs-5.14.0-570.37.1.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.
```

Процесс загрузки системы

3.2 Работа с режимом rescue

При загрузке системы редактируем параметры ядра, добавляя `systemd.unit=rescue.target` и удаляя параметры `rhgb quiet` (рис. [fig:004?]).

```
GRUB version 2.06

load_video
set gfxpayload=keep
insmod gzio
linux ($root)/vmlinuz-5.14.0-570.37.1.el9_6.x86_64 root=/dev/mapper/r1-root\
ro resume=/dev/mapper/r1-swap rd.lvm.lv=r1/root rd.lvm.lv=r1/swap rhgb qui\
et crashkernel=16-4G:192M,4G-64G:256M,64G-:512M systemd.unit=rescue.target_\
initrd ($root)/initramfs-5.14.0-570.37.1.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.
```

Редактирование параметров ядра для rescue mode

После загрузки в режиме rescue наблюдаем предупреждения системы (рис. [fig:005?]).

```
Booting a command list
[ 3.161927] Warning: Unmaintained driver is detected: e1000
[ 3.858884] vmwgfx 0000:00:02.0: [drm] *ERROR* vmwgfx seems to be running on
an unsupported hypervisor.
[ 3.858921] vmwgfx 0000:00:02.0: [drm] *ERROR* This configuration is likely b
roken.
[ 3.858998] vmwgfx 0000:00:02.0: [drm] *ERROR* Please switch to a supported g
raphics device to avoid problems.
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.
Give root password for maintenance
(or press Control-D to continue): _
```

Предупреждения системы в rescue mode

UNIT	LOAD	ACTIVE	SUB	DESCR
proc-sys-fs-binfmt_misc.automount	loaded	active	waiting	Arbit
sys-devices-pci0000:00-0000:00:01.1-ata2-host2-target2:0:0-2:0:0:0-block-sr0.device	loaded	active	plugged	UBOX
sys-devices-pci0000:00-0000:00:03.0-net-emp8s3.device	loaded	active	plugged	82540
sys-devices-pci0000:00-0000:00:05.0-sound-card0-control09.device	loaded	active	plugged	/sys/
sys-devices-pci0000:00-0000:00:0d.0-ata3-host1-target1:0:0-1:0:0:0-block-sda-sda1.device	loaded	active	plugged	UBOX
sys-devices-pci0000:00-0000:00:0d.0-ata3-host1-target1:0:0-1:0:0:0-block-sda-sda2.device	loaded	active	plugged	UBOX
sys-devices-pci0000:00-0000:00:0d.0-ata3-host1-target1:0:0-1:0:0:0-block-sda.device	loaded	active	plugged	UBOX
sys-devices-platform-serial8250-ttyS0.device	loaded	active	plugged	/sys/
sys-devices-platform-serial8250-ttyS1.device	loaded	active	plugged	/sys/
sys-devices-platform-serial8250-ttyS2.device	loaded	active	plugged	/sys/
sys-devices-platform-serial8250-ttyS3.device	loaded	active	plugged	/sys/
sys-devices-virtual-block-dm\x2d0.device	loaded	active	plugged	/sys/
sys-devices-virtual-block-dm\x2d1.device	loaded	active	plugged	/sys/
sys-module-conf igfs.device	loaded	active	plugged	/sys/
sys-module-fuse.device	loaded	active	plugged	/sys/
sys-subsystem-net-devices-emp8s3.device	loaded	active	plugged	82540
_.mount	loaded	active	mounted	Root
boot.mount	loaded	active	mounted	/boot
dev-hugepages.mount	loaded	active	mounted	Huge
dev-mqueue.mount	loaded	active	mounted	POSIX
run-credentials-systemd\x2dsysctl.service.mount	loaded	active	mounted	/run/
run-credentials-systemd\x2dtmpfiles\x2dsetup.service.mount	loaded	active	mounted	/run/
run-credentials-systemd\x2dtmpfiles\x2dsetup\x2ddev.service.mount	loaded	active	mounted	/run/
sys-fs-fuse-connections.mount	loaded	active	mounted	FUSE
sys-kernel-conf ig.mount	loaded	active	mounted	Kerne
sys-kernel-debug.mount	loaded	active	mounted	Kerne
sys-kernel-tracing.mount	loaded	active	mounted	Kerne
systemd-ask-password-plymouth.path	loaded	active	waiting	Force
init.scope	loaded	active	running	Syste
alsa-state.service	loaded	active	running	Manag
dracut-shutdown.service	loaded	active	exited	Restr
kmod-static-nodes.service	loaded	active	exited	Creat
lvm2-monitor.service	loaded	active	exited	Monit
nfs-doesmaine.service	loaded	active	exited	Read
plymouth-read-write.service	loaded	active	exited	Tell
plymouth-start.service	loaded	active	exited	Show
rescue.service	loaded	active	running	Rescu
systemd-boot-update.service	loaded	active	exited	Autom
systemd-journal-flush.service	loaded	active	exited	Flush
systemd-journald.service	loaded	active	running	Journ
systemd-modules-load.service	loaded	active	exited	Load
systemd-network-generator.service	loaded	active	exited	Gener
systemd-random-seed.service	loaded	active	exited	Load
systemd-remount-fs.service	loaded	active	exited	Remou
systemd-sysctl.service	loaded	active	exited	Appli
systemd-tmpfiles-setup-dev.service	loaded	active	exited	Creat
systemd-tmpfiles-setup.service	loaded	active	exited	Creat
systemd-udev-settle.service	loaded	active	exited	Wait
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Смотрим все модули

Просматриваем список загруженных модулей системы (рис. [fig:007?], [fig:008?]).

```
[root@ndbaranov ~]# systemctl show-environment
LANG=en_US.UTF-8
PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin
[root@ndbaranov ~]# _
```

UNIT	LOAD	ACTIVE	SUB
dev-cdrom.device	loaded	activating	tentative
dev-disk-by\x22id\x22iskseq-2.device	loaded	activating	tentative
dev-disk-by\x22id\x22iskseq-3.device	loaded	activating	tentative
dev-disk-by\x22id\x22ata\x22UD\x22CD\x22ROM-UB2\x22a01788376.device	loaded	activating	tentative
dev-disk-by\x22id\x22ata\x22UD\x22HARDDISK-UBce582156\x22a3af68582.device	loaded	activating	tentative
dev-disk-by\x22id\x22ata\x22UD\x22HARDDISK-UBce582156\x22a3af68582\x22part1.device	loaded	activating	tentative
dev-disk-by\x22id\x22ata\x22UD\x22HARDDISK-UBce582156\x22a3af68582\x22part2.device	loaded	activating	tentative
dev-disk-by\x22label\x22Uos\x22Gns-7.2.0.device	loaded	activating	tentative
dev-disk-by\x22partuuid\x22-ae77338c\x22a481.device	loaded	activating	tentative
dev-disk-by\x22partuuid\x22-ae77338c\x22a482.device	loaded	activating	tentative
dev-disk-by\x22path\x22-pci\x22x240000:00:01.1\x22data\x22a22.0.device	loaded	activating	tentative
dev-disk-by\x22path\x22-pci\x22x240000:00:01.1\x22data\x22a22.device	loaded	activating	tentative
dev-disk-by\x22path\x22-pci\x22x240000:00:0d.0\x22data\x22a21.0.device	loaded	activating	tentative
dev-disk-by\x22path\x22-pci\x22x240000:00:0d.0\x22data\x22a21.0\x22part1.device	loaded	activating	tentative
dev-disk-by\x22path\x22-pci\x22x240000:00:0d.0\x22data\x22a21.0\x22part2.device	loaded	activating	tentative
dev-disk-by\x22path\x22-pci\x22x240000:00:0d.0\x22data\x22a21.device	loaded	activating	tentative
dev-disk-by\x22path\x22-pci\x22x240000:00:0d.0\x22data\x22a21\x22part1.device	loaded	activating	tentative
dev-disk-by\x22path\x22-pci\x22x240000:00:0d.0\x22data\x22a21\x22part2.device	loaded	activating	tentative
dev-disk-by\x22id\x22-2825\x22a400\x22a213\x22a220\x22a440\x22a89\x22a262.device	loaded	activating	tentative
dev-disk-by\x22id\x22-55c3f8d0\x22a2443d\x22a244cc0\x22a24f4d\x22a247e555152edf4.device	loaded	activating	tentative
dev-sda.device	loaded	activating	tentative
dev-sda1.device	loaded	activating	tentative
dev-sda2.device	loaded	activating	tentative
dev-sr0.device	loaded	activating	tentative
dev-ttyS0.device	loaded	activating	tentative
dev-ttyS1.device	loaded	activating	tentative
dev-ttyS2.device	loaded	activating	tentative
dev-ttyS3.device	loaded	activating	tentative
sys-devices-pci0000:00-0000:00:01.1-ata2-host1-target1:0:0-1:0:0:0-block-sr0.device	loaded	activating	tentative
sys-devices-pci0000:00-0000:00:03.0-net-emp83.device	loaded	activating	tentative
sys-devices-pci0000:00-0000:00:0d.0-ata3-host2-target2:0:0-2:0:0:0-block-sda-sda1.device	loaded	activating	tentative
sys-devices-pci0000:00-0000:00:0d.0-ata3-host2-target2:0:0-2:0:0:0-block-sda-sda2.device	loaded	activating	tentative
sys-devices-pci0000:00-0000:00:0d.0-ata3-host2-target2:0:0-2:0:0:0-block-sda.device	loaded	activating	tentative
sys-devices-platform-serial8250-tty-ttyS0.device	loaded	activating	tentative
sys-devices-platform-serial8250-tty-ttyS1.device	loaded	activating	tentative
sys-devices-platform-serial8250-tty-ttyS2.device	loaded	activating	tentative
sys-devices-platform-serial8250-tty-ttyS3.device	loaded	activating	tentative
sys-devices-virtual-block-dm\x2200.device	loaded	active	plugged
sys-devices-virtual-block-dm\x22a1.device	loaded	active	plugged
sys-module-configfs.device	loaded	activating	tentative
sys-module-fuse.device	loaded	activating	tentative
sys-subsystem-net-devices-emp83.device	loaded	activating	tentative
-mount	loaded	active	mounted
init.scope	loaded	active	running
emergency.service	loaded	active	running
plymouth-start.service	loaded	active	exited
systemd-journald.service	loaded	active	running
-slice	loaded	active	active

lines 1-49

3.3 Работа с режимом emergency

Повторно редактируем параметры ядра, добавляя `systemd.unit=emergency.target` (рис. [fig:009?]).

```
Booting a command list
[ 3.211260] Warning: Unmaintained driver is detected: e1000
[ 4.177042] vmwgfx 0000:00:02.0: [drm] *ERROR* vmwgfx seems to be running on
an unsupported hypervisor.
[ 4.177050] vmwgfx 0000:00:02.0: [drm] *ERROR* This configuration is likely b
roken.
[ 4.177056] vmwgfx 0000:00:02.0: [drm] *ERROR* Please switch to a supported g
raphics device to avoid problems.
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
Changing password for user root.
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: all authentication tokens updated successfully.
sh-5.1# load_policy -i
sh-5.1# load_policy -i
sh-5.1# chcon -t shadow_t /etc/shadow
sh-5.1#
```

Редактирование параметров ядра для emergency mode

В режиме emergency выполняем восстановление системы, включая смену пароля root и восстановление контекстов SELinux (рис. [fig:009?]).

```

Booting a command list
[ 3.211268] Warning: Unmaintained driver is detected: e1000
[ 4.177842] vmwgfx 0000:00:02.0: [drm] *ERROR* vmwgfx seems to be running on
an unsupported hypervisor.
[ 4.177858] vmwgfx 0000:00:02.0: [drm] *ERROR* This configuration is likely b
roken.
[ 4.177856] vmwgfx 0000:00:02.0: [drm] *ERROR* Please switch to a supported g
raphics device to avoid problems.
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
Changing password for user root.
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: all authentication tokens updated successfully.
sh-5.1# load_policy -i
sh-5.1# load_policy -i
sh-5.1# chcon -t shadow_t /etc/shadow
sh-5.1#

```

Восстановление системы в emergency mode

Выполненные действия в emergency mode: 1. Перемонтирование файловой системы в режим чтения-записи: `mount -o remount,rw /sysroot` 2. Смена корневого каталога: `chroot /sysroot` 3. Смена пароля root: `passwd` 4. Загрузка политики SELinux: `load_policy -i` 5. Восстановление контекста безопасности: `chcon -t shadow_t /etc/shadow`

3.4 Восстановление пароля root

Используем параметр `rd.break` для остановки загрузки на раннем этапе (рис. [fig:009?]).

```

Booting a command list
[ 3.211268] Warning: Unmaintained driver is detected: e1000
[ 4.177842] vmwgfx 0000:00:02.0: [drm] *ERROR* vmwgfx seems to be running on
an unsupported hypervisor.
[ 4.177858] vmwgfx 0000:00:02.0: [drm] *ERROR* This configuration is likely b
roken.
[ 4.177856] vmwgfx 0000:00:02.0: [drm] *ERROR* Please switch to a supported g
raphics device to avoid problems.
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
Changing password for user root.
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: all authentication tokens updated successfully.
sh-5.1# load_policy -i
sh-5.1# load_policy -i
sh-5.1# chcon -t shadow_t /etc/shadow
sh-5.1#

```

Использование `rd.break` для восстановления пароля

Процесс восстановления пароля: 1. Остановка загрузки перед монтированием корневой файловой системы 2. Перемонтирование системного образа в режим чтения-записи 3. Смена корневого каталога 4. Установка нового пароля для root 5. Загрузка политики SELinux и восстановление контекстов безопасности

4. Выводы

Мы получили навыки работы с загрузчиком системы GRUB2.

Список литературы