

# Лабораторная работа №1

## Операционные системы

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Целью данной работы является приобретение практических навыков установки операционной системы на виртуальную машину, настройки минимально необходимых для дальнейшей работы сервисов.

Установка виртуальной машины в virtualbox

## Создаю машину

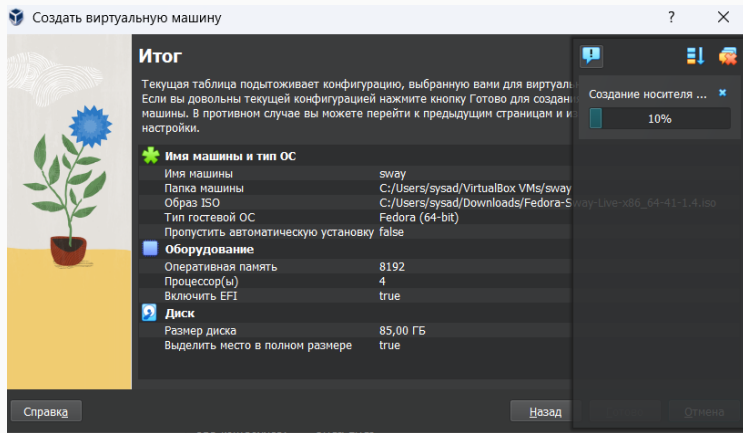


Рис. 1: создание

Запускаю машину

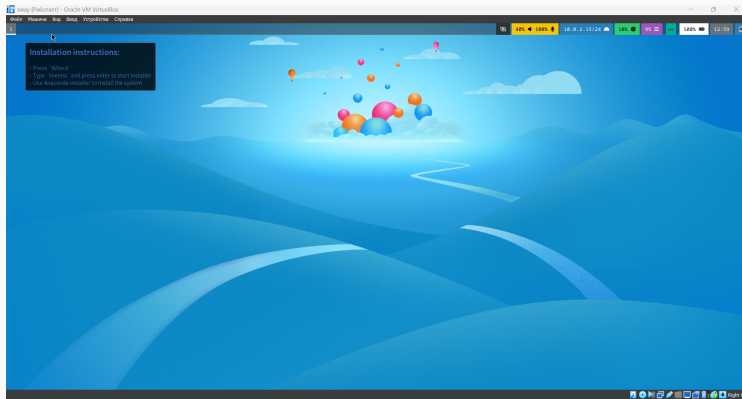
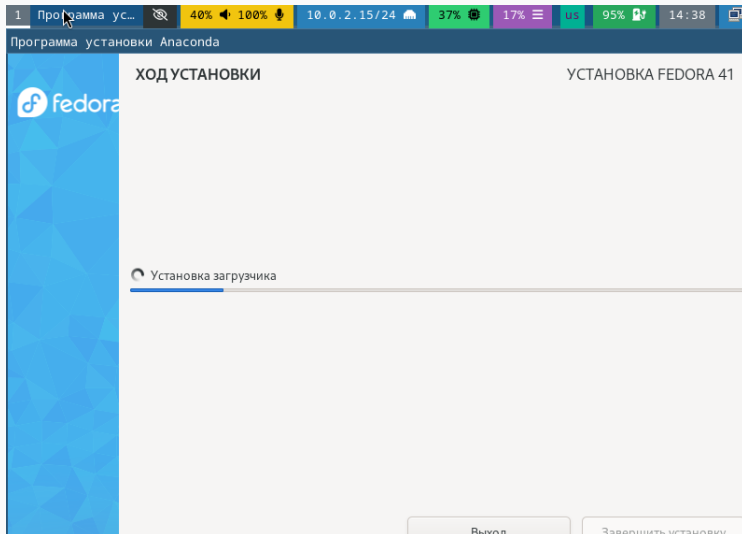


Рис. 2: запуск

Устанавливаю машину на диск



## После установки

Устанавливаю средства разработки:

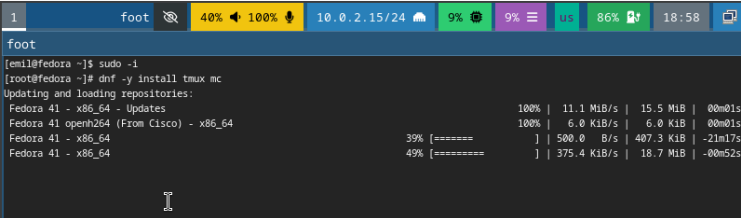
```
sudo dnf -y group install development-tools
```

Обновляю все пакеты

```
sudo dnf -y update
```

Программы для удобства работы в консоли:

```
sudo dnf -y install tmux mc
```



The screenshot shows a terminal window with a top status bar containing system information like battery, network, and time. The terminal output shows a user switching to root and installing development tools and updates. The progress of the update is shown in a table-like format.

```
1 foot 40% 100% 10.0.2.15/24 9% 9% us 86% 18:58
```

```
foot
[emil@fedora ~]$ sudo -i
[root@fedora ~]# dnf -y install tmux mc
Updating and loading repositories:
Fedora 41 - x86_64 - Updates                100% | 11.1 MiB/s | 15.5 MiB | 00m01s
Fedora 41 openh264 (From Cisco) - x86_64   100% | 6.0 KiB/s | 6.0 KiB | 00m01s
Fedora 41 - x86_64                          39% [=====] | 500.0 B/s | 407.3 KiB | -21m17s
Fedora 41 - x86_64                          49% [=====] | 375.4 KiB/s | 18.7 MiB | -00m52s
```

Автоматическое обновление

Установка программного обеспечения:

```
sudo dnf -y install dnf-automatic
```

```
[root@fedora ~]# dnf install dnf-automatic
Updating and loading repositories:
Repositories loaded.
Package Arch Version Repository Size
Upgrading:
dnf5 x86_64 5.2.10.0-2.fc41 updates 2.2 MiB
replacing dnf5 x86_64 5.2.6.2-1.fc41 anaconda 1.6 MiB
dnf5-plugins x86_64 5.2.10.0-2.fc41 updates 1.2 MiB
replacing dnf5-plugins x86_64 5.2.6.2-1.fc41 anaconda 1.0 MiB
libdnf5 x86_64 5.2.10.0-2.fc41 updates 3.5 MiB
replacing libdnf5 x86_64 5.2.6.2-1.fc41 anaconda 3.2 MiB
libdnf5-cli x86_64 5.2.10.0-2.fc41 updates 878.8 KiB
replacing libdnf5-cli x86_64 5.2.6.2-1.fc41 anaconda 779.7 KiB
Installing:
dnf5-plugin-automatic x86_64 5.2.10.0-2.fc41 updates 178.6 KiB

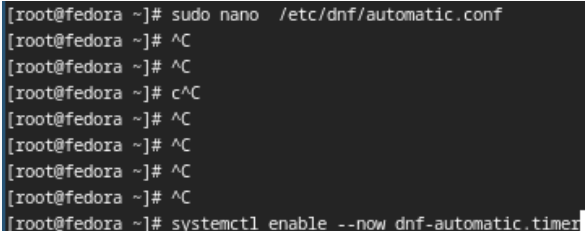
Transaction Summary:
Installing: 1 package
Upgrading: 4 packages
Replacing: 4 package

Total size of inbound packages is 3 MiB. Need to download 3 MiB.
After this operation, 1 MiB extra will be used (install 8 MiB, remove 7 MiB).
Is this ok [y/N]:
```



Задаю необходимую конфигурацию в файле `/etc/dnf/automatic.conf`.

```
sudo systemctl enable --now dnf-automatic.timer
```



```
[root@fedora ~]# sudo nano /etc/dnf/automatic.conf
[root@fedora ~]# ^C
[root@fedora ~]# ^C
[root@fedora ~]# c^C
[root@fedora ~]# ^C
[root@fedora ~]# ^C
[root@fedora ~]# ^C
[root@fedora ~]# ^C
[root@fedora ~]# ^C
[root@fedora ~]# systemctl enable --now dnf-automatic.timer
```

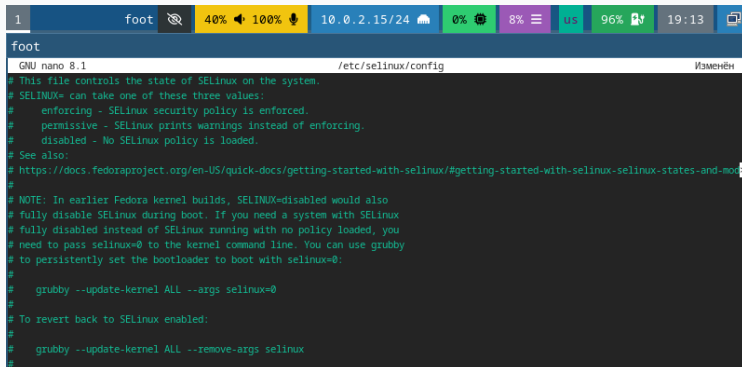
Рис. 6: конфигурация

# Отключение SELINUX

В файле `/etc/selinux/config` заменяю значение `SELINUX=enforcing` на значение `SELINUX=permissive`

Перегружаю виртуальную машину:

`sudo systemctl reboot`

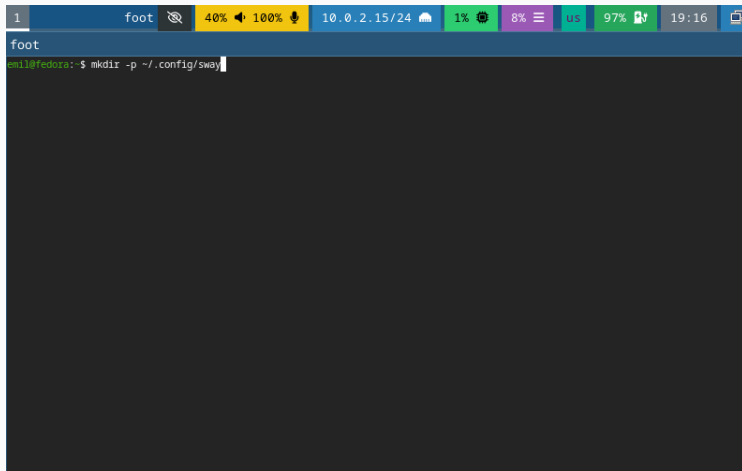
A screenshot of a terminal window. The top bar shows a terminal icon, the name 'foot', and system status icons including battery (40%), volume (100%), network (10.0.2.15/24), CPU (0%), memory (8%), locale (us), and power (96%). The terminal title is 'foot'. The main content shows the file `/etc/selinux/config` being edited with GNU nano 8.1. The file content includes comments about SELinux states and instructions on how to disable it using grubby. The current line being edited is `SELINUX=permissive`.

```
1      foot  40%  100%  10.0.2.15/24  0%  8%  us  96%  19:13
foot
GNU nano 8.1 /etc/selinux/config
# This file controls the state of SELinux on the system.
# SELINUX= can take one of these three values:
#   enforcing - SELinux security policy is enforced.
#   permissive - SELinux prints warnings instead of enforcing.
#   disabled - No SELinux policy is loaded.
# See also:
# https://docs.fedoraproject.org/en-US/quick-docs/getting-started-with-selinux/#getting-started-with-selinux-states-and-mod
#
# NOTE: In earlier Fedora kernel builds, SELINUX=disabled would also
# fully disable SELinux during boot. If you need a system with SELinux
# fully disabled instead of SELinux running with no policy loaded, you
# need to pass selinux=0 to the kernel command line. You can use grubby
# to persistently set the bootloader to boot with selinux=0:
#
#   grubby --update-kernel ALL --args selinux=0
#
# To revert back to SELinux enabled:
#
#   grubby --update-kernel ALL --remove-args selinux
#
```

## Создание конфигурационного файла

Создаю конфигурационный файл ~/.config/sway/config.d/95-system-keyboard-config.conf:

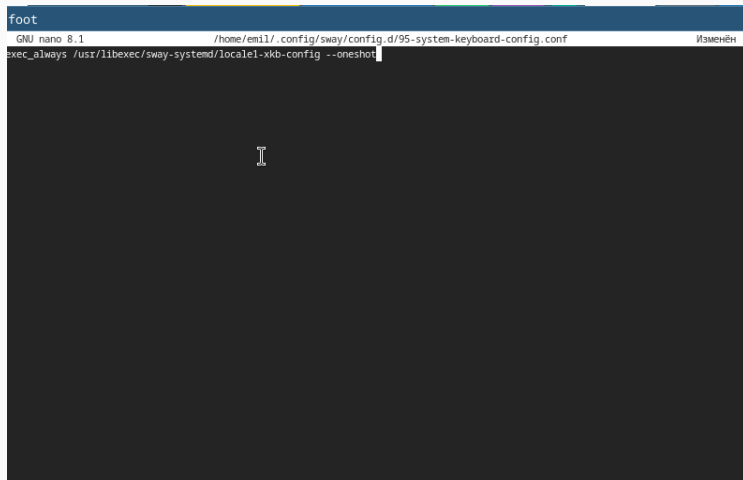
```
mkdir -p ~/.config/sway touch ~/.config/sway/config.d/95-system-keyboard-config.conf
```



A terminal window titled 'foot' with a status bar at the top showing various system metrics. The terminal content shows the command 'mkdir -p ~/.config/sway' being executed in a shell with the prompt 'emil@fedora:~\$'.

```
foot
emil@fedora:~$ mkdir -p ~/.config/sway
```

редактирую конфигурационный файл `~/.config/sway/config.d/95-system-keyboard-config.conf`:



The screenshot shows a terminal window with a dark background. At the top, a blue status bar displays 'foot'. Below it, a white header bar shows 'GNU nano 8.1' on the left, the file path '/home/emil/.config/sway/config.d/95-system-keyboard-config.conf' in the center, and 'Изменён' (Changed) on the right. The main editing area is dark gray. The first line of the file contains the text 'exec\_always /usr/libexec/sway-systemd/locale1-xkb-config --oneshot'. A white cursor is positioned at the end of this line.

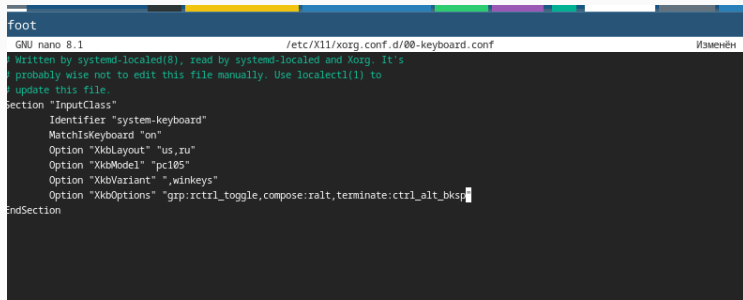
```
foot
GNU nano 8.1 /home/emil/.config/sway/config.d/95-system-keyboard-config.conf Изменён
exec_always /usr/libexec/sway-systemd/locale1-xkb-config --oneshot
```

Отредактировал конфигурационный файл /etc/X11/xorg.conf.d/00-keyboard.conf:

Section "InputClass" Identifier "system-keyboard" MatchIsKeyboard "on" Option "XkbLayout" "us,ru"

Option "XkbVariant" ",winkeys" Option "XkbOptions"

"grp:rctrl\_toggle,compose:ralt,terminate:ctrl\_alt\_bksp" EndSection



```
foot
GNU nano 8.1 /etc/X11/xorg.conf.d/00-keyboard.conf Изменен
# Written by systemd-localed(8), read by systemd-localed and Xorg. It's
# probably wise not to edit this file manually. Use localectl(1) to
# update this file.
section "InputClass"
    Identifier "system-keyboard"
    MatchIsKeyboard "on"
    Option "XkbLayout" "us,ru"
    Option "XkbModel" "pc105"
    Option "XkbVariant" ",winkeys"
    Option "XkbOptions" "grp:rctrl_toggle,compose:ralt,terminate:ctrl_alt_bksp"
EndSection
```

Рис. 10: редактирование

## устанавливаю pandoc

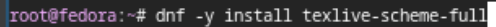
```
foot
mil@fedora:~$ sudo -i
root@fedora:~# dnf -y install pandoc
Обновление и загрузка репозитория:
Репозитории загружены.
Пакет Арх. Версия Репозиторий Размер
Установка:
pandoc x86_64 3.1.11.1-32.fc41 fedora 185.0 MiB
Установка зависимостей:
pandoc-common noarch 3.1.11.1-31.fc41 fedora 1.9 MiB

Сводка транзакции:
Установка: 2 пакетов

Общий размер входящих пакетов составляет 27 MiB. Необходимо загрузить 27 MiB.
После этой операции будут использоваться дополнительные 187 MiB (установка 187 MiB, удаление 0 B).
[1/2] pandoc-0:3.1.11.1-32.fc41.x86_64 0% [ <=> ] | 1.0 B/s | 0.0 B | ?
[1/2] pandoc-0:3.1.11.1-32.fc41.x86_64 0% [ ] | 1.0 B/s | 37.1 KiB | ?
[1/2] pandoc-common-0:3.1.11.1-31.fc41.noarch 100% | 724.8 KiB/s | 537.1 KiB | 00m01s
[2/2] pandoc-0:3.1.11.1-32.fc41.x86_64 100% | 9.7 MiB/s | 26.0 MiB | 00m03s
-----
[2/2] Total 100% | 7.9 MiB/s | 26.5 MiB | 00m03s
Выполнение транзакции
```

Рис. 11: установка

устанавливаю texlive

A terminal window with a black background and green text. The prompt is 'root@fedora:~#'. The command entered is 'dnf -y install texlive-scheme-full'. A white cursor is at the end of the command.

```
root@fedora:~# dnf -y install texlive-scheme-full
```

Рис. 12: установка

foot						
[4594/4621]	Установка	texlive-jadetex-11:svn63654-85.fc41.noarch	100%	5.6 MiB/s	304.6 KiB	00m00s
[4595/4621]	Установка	texlive-mltex-11:svn62145-85.fc41.noarch	100%	1.6 MiB/s	51.5 KiB	00m00s
[4596/4621]	Установка	texlive-xmltex-11:svn62145-85.fc41.noarch	100%	2.4 MiB/s	161.4 KiB	00m00s
[4597/4621]	Установка	texlive-collection-formatsextra-11:svn62226-73.fc41.noarch	100%	15.1 KiB/s	124.0 B	00m00s
[4598/4621]	Установка	texlive-cslatex-11:svn66186-85.fc41.noarch	100%	1.1 MiB/s	89.6 KiB	00m00s
[4599/4621]	Установка	texlive-collection-langczechslovak-11:svn54074-73.fc41.noarch	100%	20.2 KiB/s	124.0 B	00m00s
[4600/4621]	Установка	texlive-emoji-11:svn59961-73.fc41.noarch	100%	59.9 MiB/s	1.6 MiB	00m00s
[4601/4621]	Установка	texlive-collection-luatex-11:svn65791-73.fc41.noarch	100%	15.1 KiB/s	124.0 B	00m00s
[4602/4621]	Установка	texlive-pgf-pie-11:svn63603-73.fc41.noarch	100%	4.6 MiB/s	362.2 KiB	00m00s
[4603/4621]	Установка	texlive-collection-pictures-11:svn66636-73.fc41.noarch	100%	1.0 KiB/s	124.0 B	00m00s
[4604/4621]	Установка	texlive-collection-latexextra-11:svn66548-73.fc41.noarch	100%	5.3 KiB/s	124.0 B	00m00s
[4605/4621]	Установка	texlive-scheme-full-11:svn54074-73.fc41.noarch	100%	17.3 KiB/s	124.0 B	00m00s
[4606/4621]	Установка	gstamper1-plugins-good-qt-0:1.24.8-1.fc41.x86_64	100%	2.5 MiB/s	191.1 KiB	00m00s
[4607/4621]	Установка	evince-0:46.3.1-2.fc41.x86_64	100%	2.0 MiB/s	10.5 MiB	00m05s
[4608/4621]	Установка	evince-djvu-0:46.3.1-2.fc41.x86_64	100%	4.8 MiB/s	63.8 KiB	00m00s
[4609/4621]	Установка	perl-List-MoreUtils-0:0.430-12.fc41.noarch	100%	4.7 MiB/s	165.1 KiB	00m00s
[4610/4621]	Установка	perl-Lexical-Var-0:0.010-7.fc41.x86_64	100%	1.9 MiB/s	55.9 KiB	00m00s
[4611/4621]	Установка	rubygem-rdoc-0:6.6.3.1-18.fc41.noarch	100%	5.0 MiB/s	1.8 MiB	00m00s
[4612/4621]	Установка	perl-GD-Barcode-0:2.00-5.fc41.noarch	100%	21.7 MiB/s	10.6 MiB	00m00s
[4613/4621]	Установка	perl-IO-Compress-Brotli-0:0.004001-14.fc41.x86_64	100%	1.5 MiB/s	39.0 KiB	00m00s
[4614/4621]	Установка	rubygem-bigdecimal-0:3.1.5-18.fc41.x86_64	100%	4.0 MiB/s	136.6 KiB	00m00s
[4615/4621]	Установка	rubygem-bundler-0:2.5.22-18.fc41.noarch	100%	2.1 MiB/s	1.5 MiB	00m01s
[4616/4621]	Установка	qt5-qttranslations-0:5.15.15-1.fc41.noarch	100%	20.9 MiB/s	14.8 MiB	00m01s
[4617/4621]	Установка	iio-sensor-proxy-0:3.5-5.fc41.x86_64	100%	1.9 MiB/s	163.5 KiB	00m00s
[4618/4621]	Установка	perl-Class-XSAccessor-0:1.19-36.fc41.x86_64	100%	2.5 MiB/s	101.6 KiB	00m00s
[4619/4621]	Установка	perl-PerlIO-utf8_strict-0:0.010-8.fc41.x86_64	100%	1.8 MiB/s	44.2 KiB	00m00s

Рис. 13: установка



```
[4599/4621] Установка texlive-collection-langczechslovak-11:svn54074-73.fc41.noarc 100% | 20.2 KiB/s | 124.0 B | 00m00s
[4600/4621] Установка texlive-emoji-11:svn59961-73.fc41.noarch 100% | 59.9 MiB/s | 1.6 MiB | 00m00s
[4601/4621] Установка texlive-collection-luatex-11:svn65791-73.fc41.noarch 100% | 15.1 KiB/s | 124.0 B | 00m00s
[4602/4621] Установка texlive-pgf-pie-11:svn63603-73.fc41.noarch 100% | 4.6 MiB/s | 362.2 KiB | 00m00s
[4603/4621] Установка texlive-collection-pictures-11:svn66636-73.fc41.noarch 100% | 1.0 KiB/s | 124.0 B | 00m00s
[4604/4621] Установка texlive-collection-latexextra-11:svn66548-73.fc41.noarch 100% | 5.3 KiB/s | 124.0 B | 00m00s
[4605/4621] Установка texlive-scheme-full-11:svn54074-73.fc41.noarch 100% | 17.3 KiB/s | 124.0 B | 00m00s
[4606/4621] Установка gstreamer1-plugins-good-qt-0:1.24.8-1.fc41.x86_64 100% | 2.5 MiB/s | 191.1 KiB | 00m00s
[4607/4621] Установка evince-0:46.3.1-2.fc41.x86_64 100% | 2.0 MiB/s | 10.5 MiB | 00m05s
[4608/4621] Установка evince-djvu-0:46.3.1-2.fc41.x86_64 100% | 4.8 MiB/s | 63.8 KiB | 00m00s
[4609/4621] Установка perl-List-MoreUtils-0:0.430-12.fc41.noarch 100% | 4.7 MiB/s | 165.1 KiB | 00m00s
[4610/4621] Установка perl-Lexical-Var-0:0.010-7.fc41.x86_64 100% | 1.9 MiB/s | 55.9 KiB | 00m00s
[4611/4621] Установка rubygem-rdoc-0:6.6.3.1-18.fc41.noarch 100% | 5.0 MiB/s | 1.8 MiB | 00m00s
[4612/4621] Установка perl-GD-Barcode-0:2.00-5.fc41.noarch 100% | 21.7 MiB/s | 10.6 MiB | 00m00s
[4613/4621] Установка perl-IO-Compress-Brotli-0:0.004001-14.fc41.x86_64 100% | 1.5 MiB/s | 39.0 KiB | 00m00s
[4614/4621] Установка rubygem-bigdecimal-0:3.1.5-18.fc41.x86_64 100% | 4.0 MiB/s | 136.6 KiB | 00m00s
[4615/4621] Установка rubygem-bundler-0:2.5.22-18.fc41.noarch 100% | 2.1 MiB/s | 1.5 MiB | 00m01s
[4616/4621] Установка qt5-qttranslations-0:5.15.15-1.fc41.noarch 100% | 20.9 MiB/s | 14.8 MiB | 00m01s
[4617/4621] Установка iio-sensor-proxy-0:3.5-5.fc41.x86_64 100% | 1.9 MiB/s | 163.5 KiB | 00m00s
[4618/4621] Установка perl-Class-XSAccessor-0:1.19-36.fc41.x86_64 100% | 2.5 MiB/s | 101.6 KiB | 00m00s
[4619/4621] Установка perl-PerlIO-utf8_strict-0:0.010-8.fc41.x86_64 100% | 1.8 MiB/s | 44.2 KiB | 00m00s
[4620/4621] Удаление librsvg2-0:2.59.1-1.fc41.x86_64 100% | 155.0 B/s | 14.0 B | 00m00s
[4621/4621] Удаление rsvg-pixbuf-loader-0:2.59.1-1.fc41.x86_64 100% | 0.0 B/s | 6.0 B | 09m57s
Завершено!
root@fedora:~#
выход
emil@fedora:~$ dmesg | less
[0] 0:~bash* "fedora" 20:24 20-фев-
```

Рис. 14: установка

получаю всю информацию о системе

```
1 foot 40% 100% 10.0.2.15/24 0% 11% us 100% 20:31
foot
foot
foot
0.000000 Linux version 6.11.4-301.fc41.x86_64 (mockbuild@9b6b61418589428cb880a7020233b56f) (gcc (GCC) 14.2.1 20240912 (Red Hat
14.2.1-3), GNU ld version 2.43.1-2.fc41) #1 SMP PREEMPT_DYNAMIC Sun Oct 20 15:02:33 UTC 2024
0.000000 Command line: BOOT_IMAGE=(hd0,gpt2)/vmlinuz-6.11.4-301.fc41.x86_64 root=UUID=6e376bdb-0003-4d2a-8b83-7d5aafa2c269 ro
rootflags=subvol=root rhgb quiet
0.000000 [Firmware Bug]: TSC doesn't count with P0 frequency!
0.000000 BIOS-provided physical RAM map:
0.000000 BIOS-e820: [mem 0x0000000000000000-0x000000000009ffff] usable
0.000000 BIOS-e820: [mem 0x0000000000100000-0x000000000019bfff] usable
0.000000 BIOS-e820: [mem 0x000000000019c000-0x00000000001e4fff] reserved
0.000000 BIOS-e820: [mem 0x00000000001e5000-0x00000000001decefff] usable
0.000000 BIOS-e820: [mem 0x00000000001decefff-0x00000000001def6fff] reserved
0.000000 BIOS-e820: [mem 0x00000000001def6fff-0x00000000001def7eff] ACPI data
0.000000 BIOS-e820: [mem 0x00000000001def7eff-0x00000000001def7fff] ACPI NVS
0.000000 BIOS-e820: [mem 0x00000000001def7fff-0x00000000001df36aff] usable
0.000000 BIOS-e820: [mem 0x00000000001df36aff-0x00000000001df36fff] reserved
0.000000 BIOS-e820: [mem 0x00000000001df36fff-0x00000000001df36fff] reserved
0.000000 BIOS-e820: [mem 0x00000000001df36fff-0x00000000001df36fff] reserved
0.000000 BIOS-e820: [mem 0x00000000001df36fff-0x00000000001df36fff] usable
0.000000 NX (Execute Disable) protection: active
0.000000 APIC: Static calls initialized
0.000000 efi: EFI v2.7 by EDK II
0.000000 efi: ACPI=0xdef7e000 ACPI 2.0=0xdef7e014 SMBIOS=0xdef7e000 MOKvar=0xdef7e000
0.000000 efi: Remove mem130: MMIO range=[0xffc00000-0xffffffff] (4MB) from e820 map
0.000000 e820: remove [mem 0xffc00000-0xffffffff] reserved
0.000000 secureboot: Secure boot disabled
0.000000 SMBIOS 2.5 present.
0.000000 DMI: innotek GmbH VirtualBox/VirtualBox, BIOS VirtualBox 12/01/2006
0.000000 DMI: Memory slots populated: 0/0
0.000000 Hypervisor detected: KVM
0.000000 time=2024-10-20T15:02:33.000Z uid=0 gid=0
```

Я приобрел практические навыки установки операционной системы на виртуальную машину, настройки минимально необходимых для дальнейшей работы сервисов.