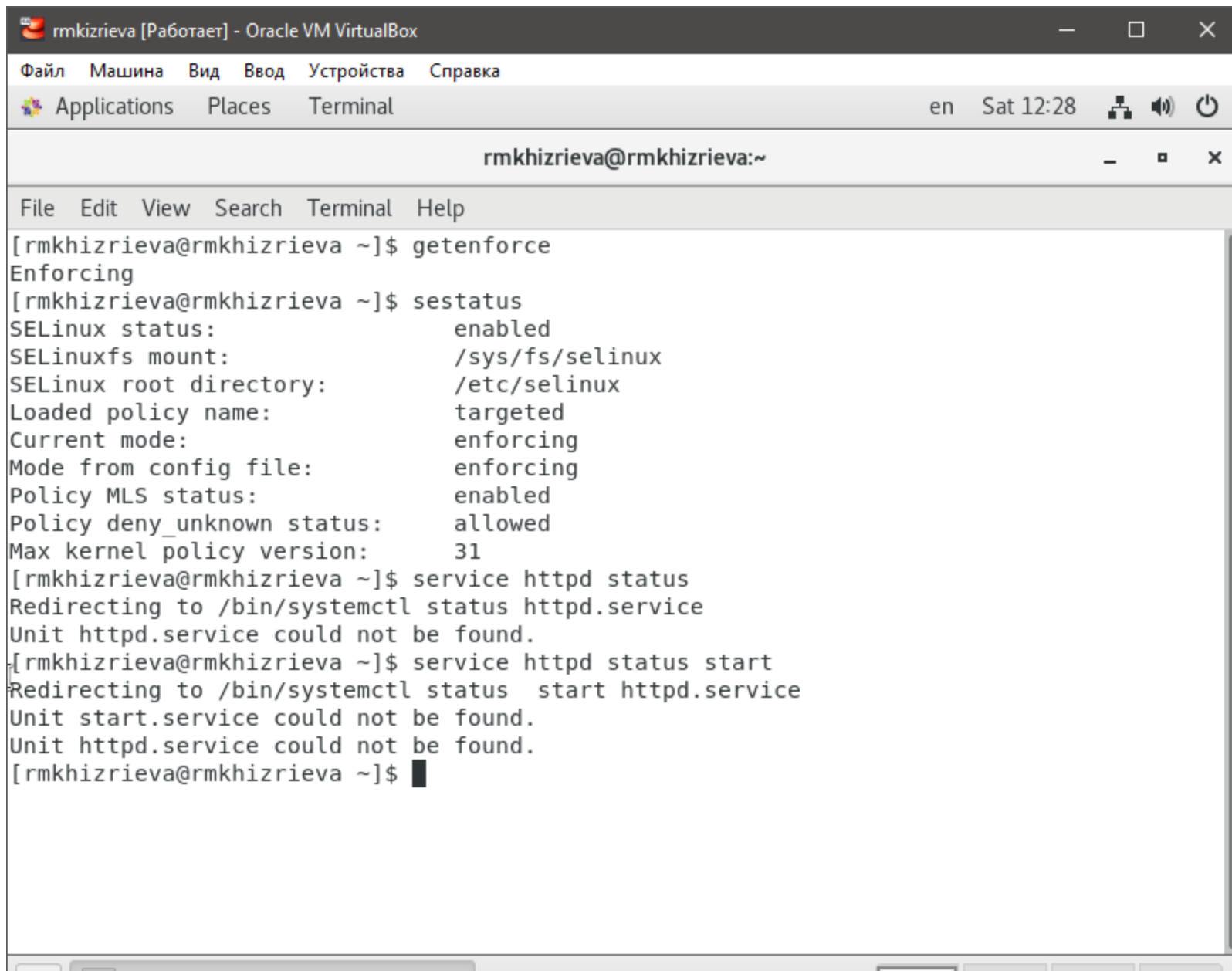


# Цели и задачи работы

## Цель лабораторной работы

Развитие навыков администрирования ОС Linux, первое практическое знакомство с технологией SELinux, а также проверка работы SELinux на практике совместно с веб-сервером Apache.

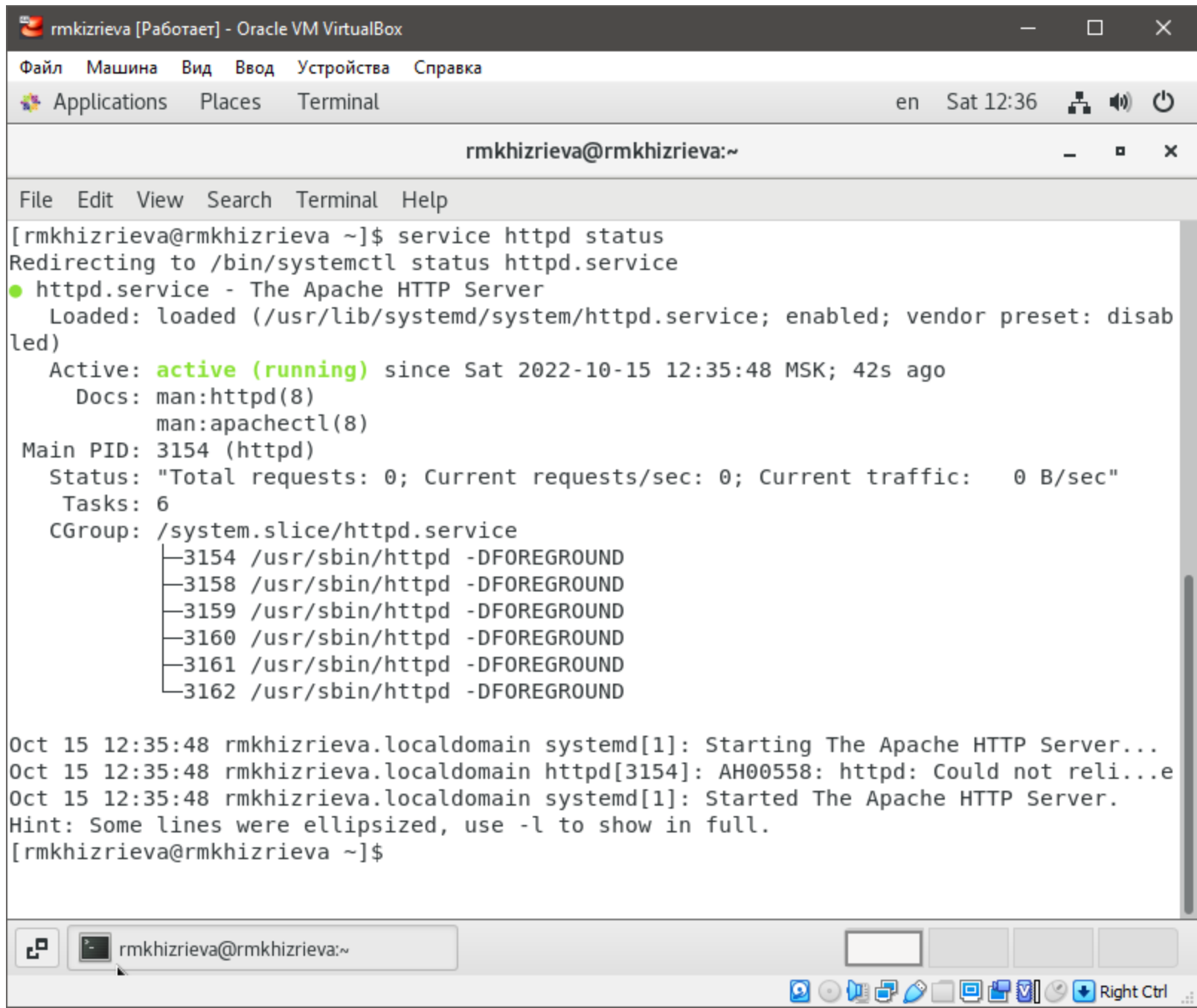
# Проверка работы SELinux и веб-сервера



The screenshot shows a terminal window titled "rmkhizrieva [Работает] - Oracle VM VirtualBox". The window has a menu bar with "Файл", "Машина", "Вид", "Ввод", "Устройства", and "Справка". Below the menu bar is a toolbar with "Applications", "Places", and "Terminal" buttons, along with a language indicator "en", a date/time "Sat 12:28", and icons for network, volume, and power. The terminal itself has a title bar "rmkhizrieva@rmkhizrieva:~" and a menu bar with "File", "Edit", "View", "Search", "Terminal", and "Help". The terminal content shows the following commands and output:

```
[rmkhizrieva@rmkhizrieva ~]$ getenforce
Enforcing
[rmkhizrieva@rmkhizrieva ~]$ sestatus
SELinux status:                enabled
SELinuxfs mount:                /sys/fs/selinux
SELinux root directory:         /etc/selinux
Loaded policy name:              targeted
Current mode:                   enforcing
Mode from config file:          enforcing
Policy MLS status:              enabled
Policy deny_unknown status:     allowed
Max kernel policy version:      31
[rmkhizrieva@rmkhizrieva ~]$ service httpd status
Redirecting to /bin/systemctl status httpd.service
Unit httpd.service could not be found.
[rmkhizrieva@rmkhizrieva ~]$ service httpd status start
Redirecting to /bin/systemctl status start httpd.service
Unit start.service could not be found.
Unit httpd.service could not be found.
[rmkhizrieva@rmkhizrieva ~]$
```

# Веб-сервер Apache

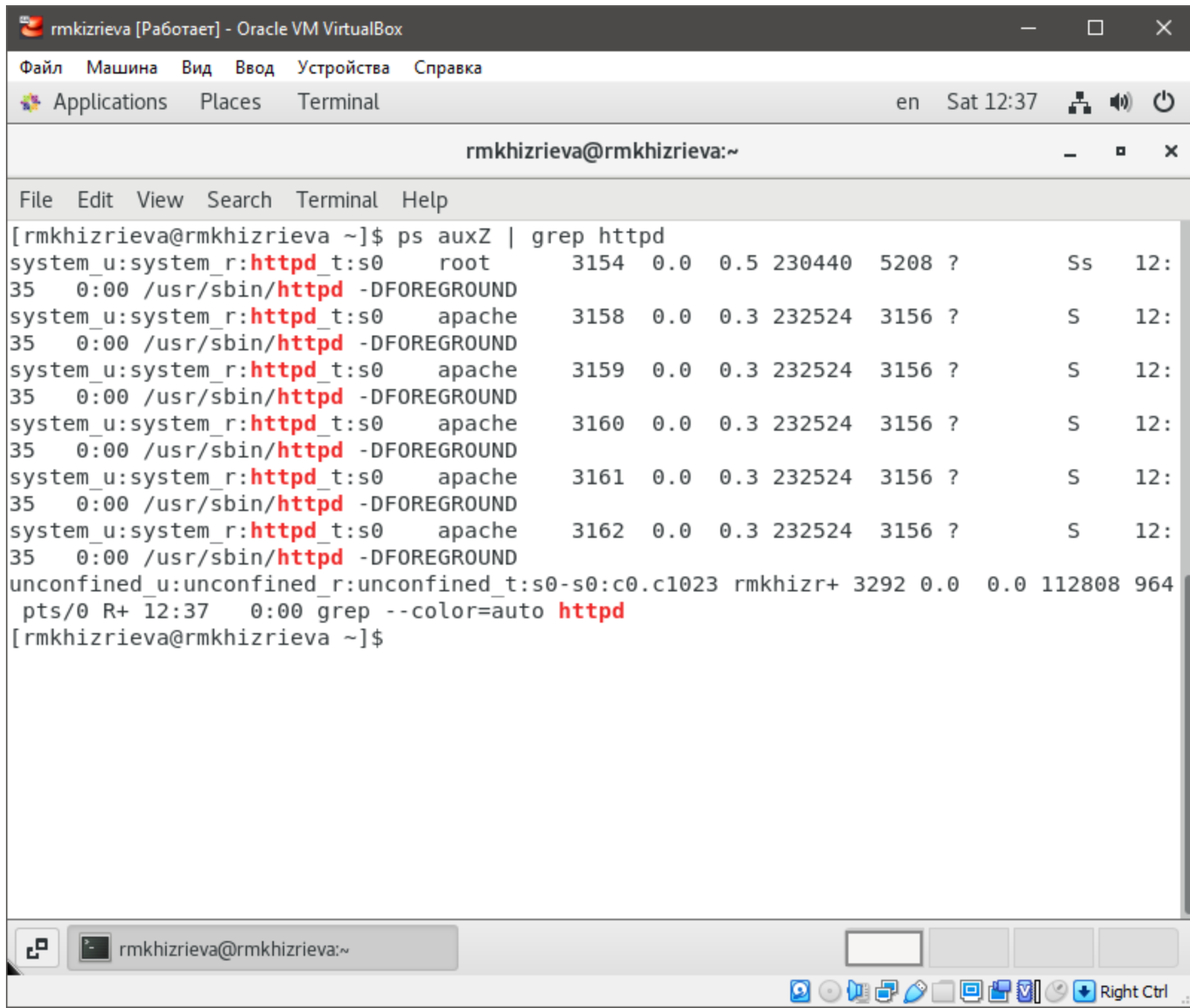


The screenshot shows a terminal window titled "rmkizrieva [Работает] - Oracle VM VirtualBox". The terminal displays the output of the command `service httpd status`. The output indicates that the Apache HTTP service is active and running. It also shows the process details for the httpd service, including the main PID and the list of child processes.

```
rmkizrieva@rmkizrieva:~$ service httpd status
Redirecting to /bin/systemctl status httpd.service
● httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; vendor preset: disabled)
   Active: active (running) since Sat 2022-10-15 12:35:48 MSK; 42s ago
     Docs: man:httpd(8)
           man:apachectl(8)
  Main PID: 3154 (httpd)
    Status: "Total requests: 0; Current requests/sec: 0; Current traffic:  0 B/sec"
     Tasks: 6
    CGroup: /system.slice/httpd.service
            └─3154 /usr/sbin/httpd -DFOREGROUND
              └─3158 /usr/sbin/httpd -DFOREGROUND
                └─3159 /usr/sbin/httpd -DFOREGROUND
                  └─3160 /usr/sbin/httpd -DFOREGROUND
                    └─3161 /usr/sbin/httpd -DFOREGROUND
                      └─3162 /usr/sbin/httpd -DFOREGROUND

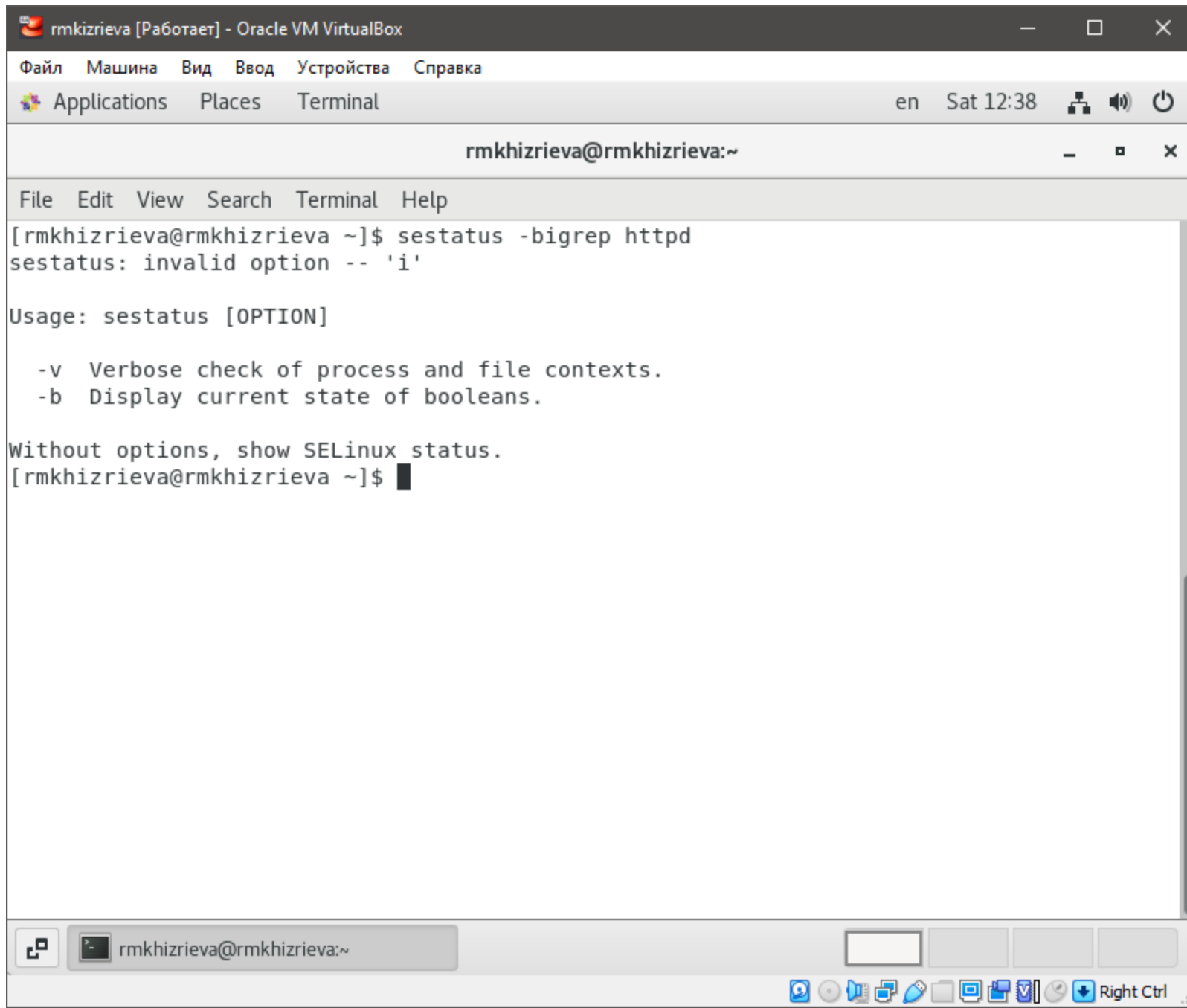
Oct 15 12:35:48 rmkizrieva.localdomain systemd[1]: Starting The Apache HTTP Server...
Oct 15 12:35:48 rmkizrieva.localdomain httpd[3154]: AH00558: httpd: Could not reli...e
Oct 15 12:35:48 rmkizrieva.localdomain systemd[1]: Started The Apache HTTP Server.
Hint: Some lines were ellipsized, use -l to show in full.
rmkizrieva@rmkizrieva:~$
```

# Состояние переключателей SELinux



```
rmkhizrieva [Работает] - Oracle VM VirtualBox
Файл  Машина  Вид  Ввод  Устройства  Справка
Applications  Places  Terminal  en  Sat 12:37
rmkhizrieva@rmkhizrieva:~
File  Edit  View  Search  Terminal  Help
[rmkhizrieva@rmkhizrieva ~]$ ps auxZ | grep httpd
system_u:system_r:httpd_t:s0    root      3154  0.0  0.5 230440  5208 ?        Ss   12:
35  0:00 /usr/sbin/httpd -DFOREGROUND
system_u:system_r:httpd_t:s0    apache    3158  0.0  0.3 232524  3156 ?        S    12:
35  0:00 /usr/sbin/httpd -DFOREGROUND
system_u:system_r:httpd_t:s0    apache    3159  0.0  0.3 232524  3156 ?        S    12:
35  0:00 /usr/sbin/httpd -DFOREGROUND
system_u:system_r:httpd_t:s0    apache    3160  0.0  0.3 232524  3156 ?        S    12:
35  0:00 /usr/sbin/httpd -DFOREGROUND
system_u:system_r:httpd_t:s0    apache    3161  0.0  0.3 232524  3156 ?        S    12:
35  0:00 /usr/sbin/httpd -DFOREGROUND
system_u:system_r:httpd_t:s0    apache    3162  0.0  0.3 232524  3156 ?        S    12:
35  0:00 /usr/sbin/httpd -DFOREGROUND
unconfined_u:unconfined_r:unconfined_t:s0-s0:c0.c1023 rmkhizr+ 3292 0.0  0.0 112808  964
pts/0 R+ 12:37  0:00 grep --color=auto httpd
[rmkhizrieva@rmkhizrieva ~]$
```

# Команда seinfo



The screenshot shows a terminal window titled "rmkizrieva [Работает] - Oracle VM VirtualBox". The window has a menu bar with "Файл", "Машина", "Вид", "Ввод", "Устройства", and "Справка". Below the menu bar is a toolbar with "Applications", "Places", and "Terminal". The terminal itself has a title bar "rmkhizrieva@rmkhizrieva:~" and a menu bar with "File", "Edit", "View", "Search", "Terminal", and "Help". The terminal content shows the command `[rmkhizrieva@rmkhizrieva ~]$ sestatus -bigrep httpd` being executed. The output is `sestatus: invalid option -- 'i'`. Below this, the usage for `sestatus` is displayed: `Usage: sestatus [OPTION]`, followed by two options: `-v Verbose check of process and file contexts.` and `-b Display current state of booleans.`. A note states: `Without options, show SELinux status.`. The prompt `[rmkhizrieva@rmkhizrieva ~]$` is shown at the bottom of the terminal. The window's taskbar at the bottom shows various icons, including a "Right Ctrl" button.

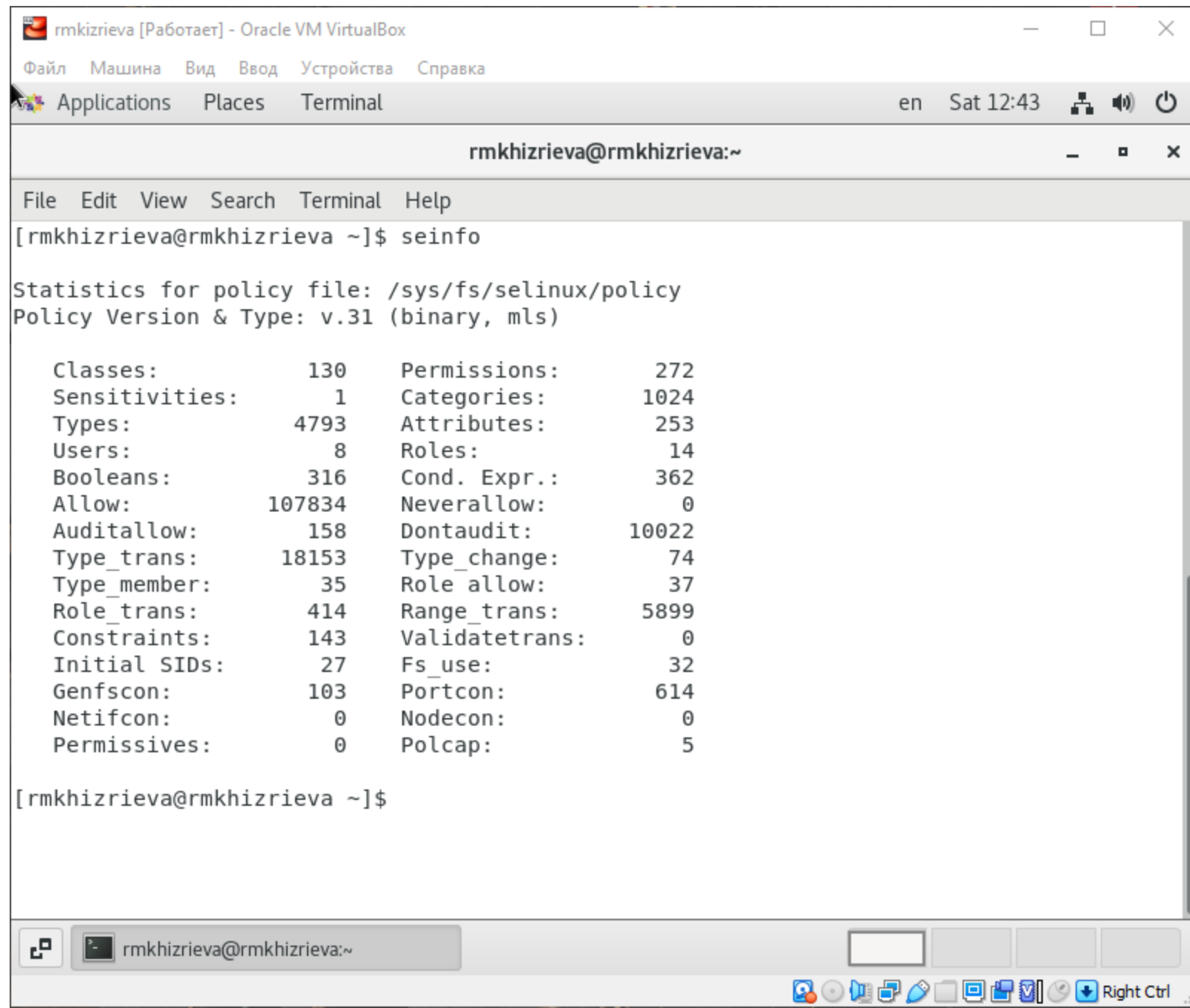
```
rmkizrieva [Работает] - Oracle VM VirtualBox
Файл  Машина  Вид  Ввод  Устройства  Справка
Applications  Places  Terminal  en  Sat 12:38
rmkhizrieva@rmkhizrieva:~
File  Edit  View  Search  Terminal  Help
[rmkhizrieva@rmkhizrieva ~]$ sestatus -bigrep httpd
sestatus: invalid option -- 'i'

Usage: sestatus [OPTION]

  -v  Verbose check of process and file contexts.
  -b  Display current state of booleans.

Without options, show SELinux status.
[rmkhizrieva@rmkhizrieva ~]$
```

# Тип файлов и поддиректорий



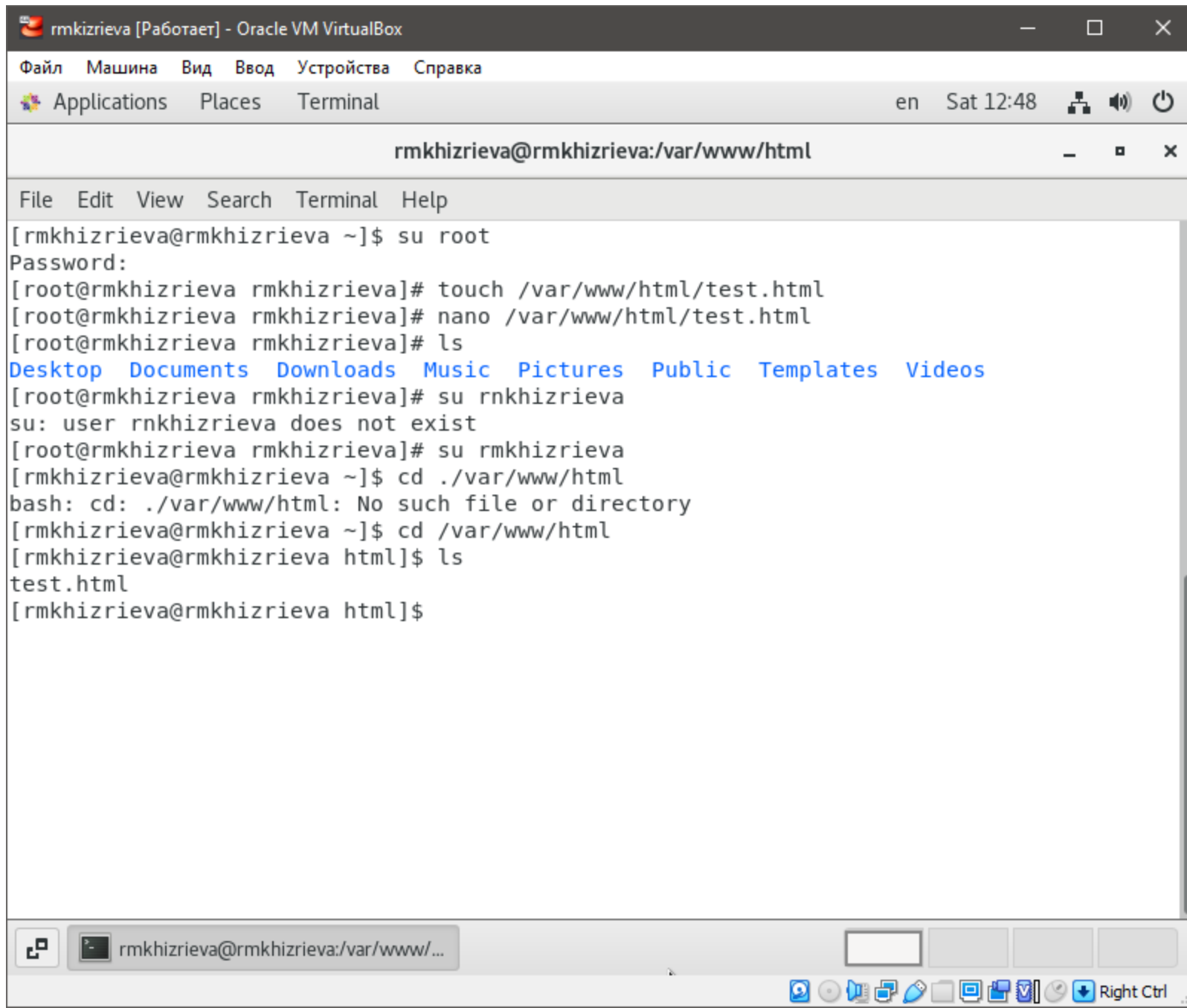
```
rmkizrieva [Работает] - Oracle VM VirtualBox
Файл  Машина  Вид  Ввод  Устройства  Справка
Applications  Places  Terminal  en  Sat 12:43
rmkhizrieva@rmkhizrieva:~
File  Edit  View  Search  Terminal  Help
[rmkhizrieva@rmkhizrieva ~]$ seinfo

Statistics for policy file: /sys/fs/selinux/policy
Policy Version & Type: v.31 (binary, mls)

Classes:          130      Permissions:        272
Sensitivities:    1        Categories:        1024
Types:            4793     Attributes:         253
Users:            8        Roles:              14
Booleans:         316     Cond. Expr.:       362
Allow:            107834   Neverallow:         0
Auditallow:       158     Dontaudit:          10022
Type_trans:       18153   Type_change:        74
Type_member:      35      Role_allow:         37
Role_trans:       414     Range_trans:        5899
Constraints:      143     Validatetrans:      0
Initial SIDs:     27      Fs_use:             32
Genfscon:         103     Portcon:            614
Netifcon:         0       Nodecon:            0
Permissives:      0       Polcap:             5

[rmkhizrieva@rmkhizrieva ~]$
```

# Создание html-файла /var/www/html/test.html

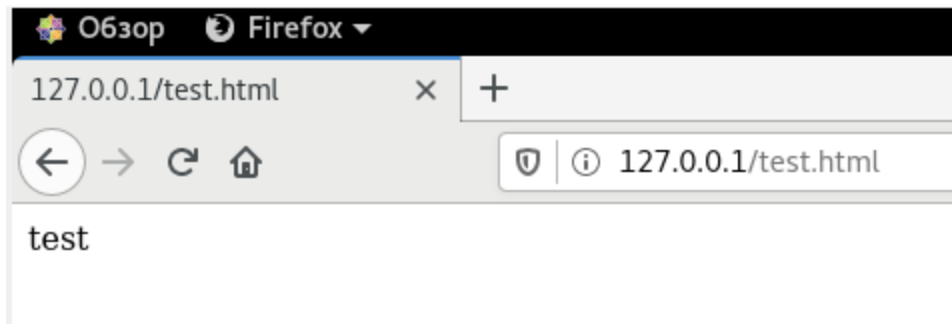


The screenshot shows a terminal window titled "rmkizrieva [Работает] - Oracle VM VirtualBox". The terminal has a menu bar with "Файл", "Машина", "Вид", "Ввод", "Устройства", and "Справка". Below the menu bar is a status bar with "Applications", "Places", "Terminal", "en", "Sat 12:48", and icons for network, volume, and power. The terminal window has a title bar "rmkhizrieva@rmkhizrieva:/var/www/html" and a menu bar with "File", "Edit", "View", "Search", "Terminal", and "Help". The terminal content shows the following commands and output:

```
[rmkhizrieva@rmkhizrieva ~]$ su root
Password:
[root@rmkhizrieva rmkhizrieva]# touch /var/www/html/test.html
[root@rmkhizrieva rmkhizrieva]# nano /var/www/html/test.html
[root@rmkhizrieva rmkhizrieva]# ls
Desktop Documents Downloads Music Pictures Public Templates Videos
[root@rmkhizrieva rmkhizrieva]# su rmkhizrieva
su: user rmkhizrieva does not exist
[root@rmkhizrieva rmkhizrieva]# su rmkhizrieva
[rmkhizrieva@rmkhizrieva ~]$ cd ./var/www/html
bash: cd: ./var/www/html: No such file or directory
[rmkhizrieva@rmkhizrieva ~]$ cd /var/www/html
[rmkhizrieva@rmkhizrieva html]$ ls
test.html
[rmkhizrieva@rmkhizrieva html]$
```

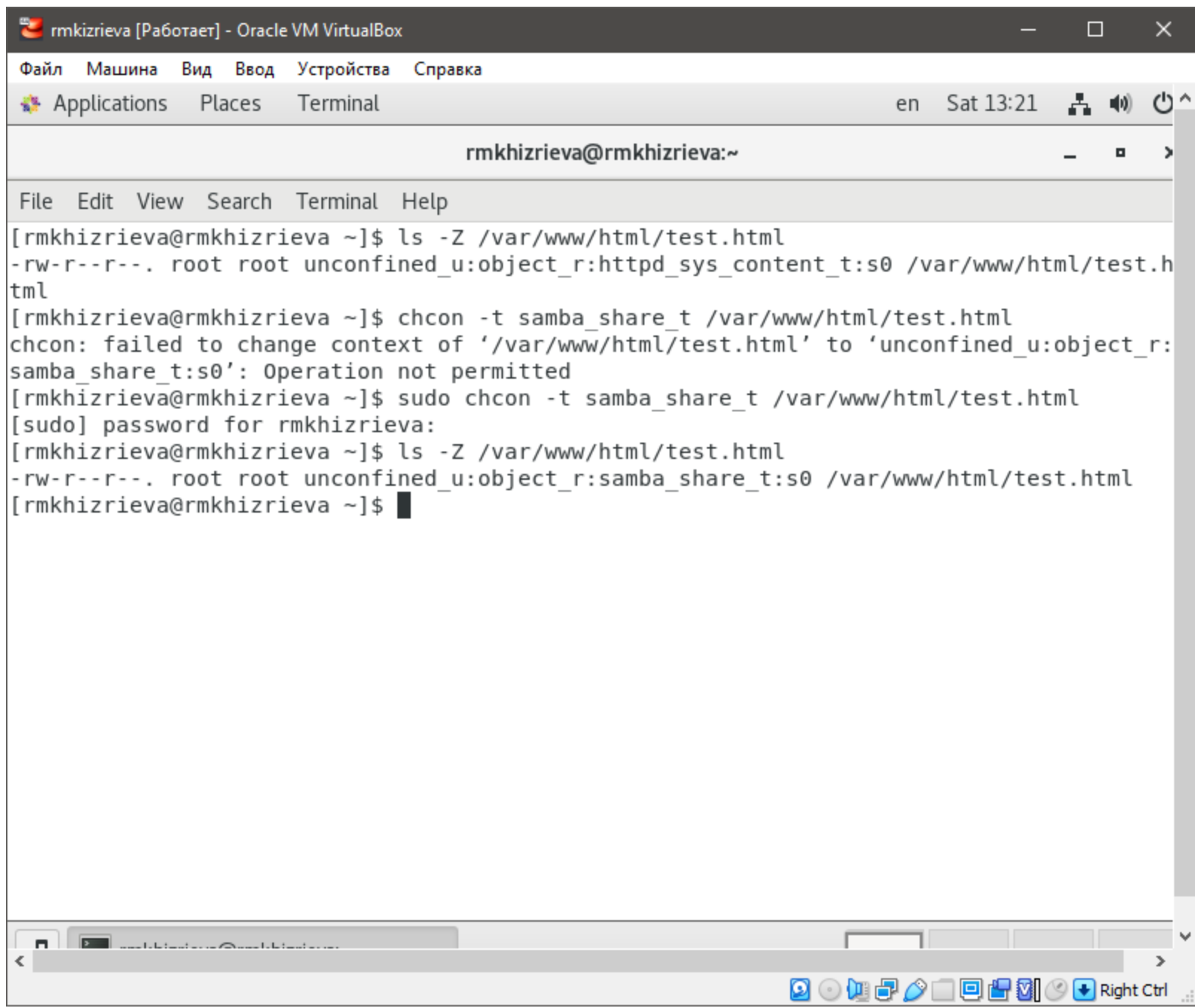
The terminal window has a taskbar at the bottom with a "rmkhizrieva@rmkhizrieva:/var/www/..." tab and a system tray with icons for network, volume, and power, and a "Right Ctrl" button.

## Обращение к файлу test.html





# Контекст файла test.html

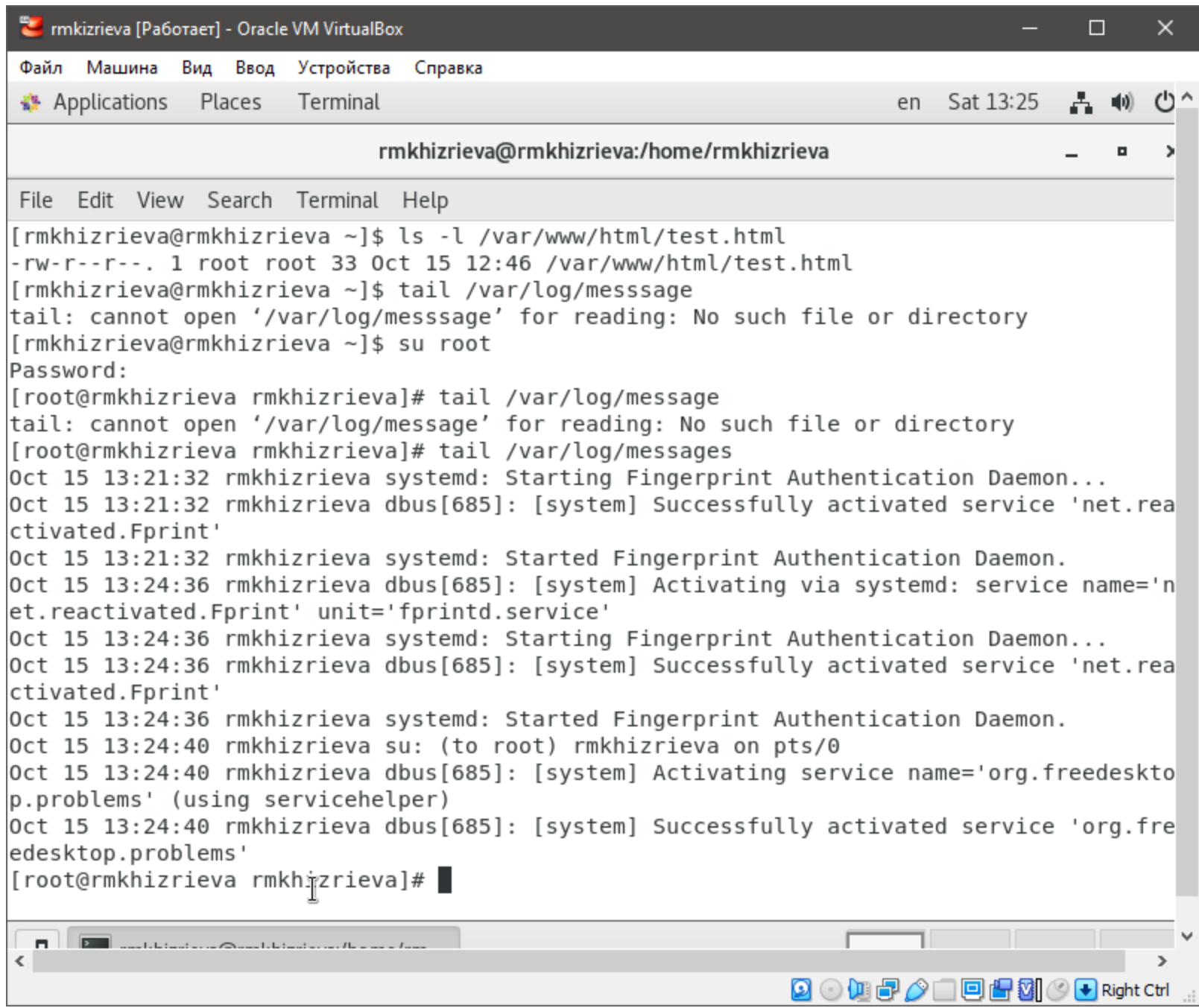


The screenshot shows a terminal window titled "rmkhizrieva [Работает] - Oracle VM VirtualBox". The terminal has a menu bar with "Файл", "Машина", "Вид", "Ввод", "Устройства", and "Справка". Below the menu bar is a status bar with "Applications", "Places", "Terminal", "en", "Sat 13:21", and system icons. The terminal prompt is "rmkhizrieva@rmkhizrieva:~". The terminal content shows the following commands and output:

```
File Edit View Search Terminal Help
[rmkhizrieva@rmkhizrieva ~]$ ls -Z /var/www/html/test.html
-rw-r--r--. root root unconfined_u:object_r:httpd_sys_content_t:s0 /var/www/html/test.html
[rmkhizrieva@rmkhizrieva ~]$ chcon -t samba_share_t /var/www/html/test.html
chcon: failed to change context of '/var/www/html/test.html' to 'unconfined_u:object_r:samba_share_t:s0': Operation not permitted
[rmkhizrieva@rmkhizrieva ~]$ sudo chcon -t samba_share_t /var/www/html/test.html
[sudo] password for rmkhizrieva:
[rmkhizrieva@rmkhizrieva ~]$ ls -Z /var/www/html/test.html
-rw-r--r--. root root unconfined_u:object_r:samba_share_t:s0 /var/www/html/test.html
[rmkhizrieva@rmkhizrieva ~]$
```

The terminal window has a standard Linux desktop environment at the bottom with various application icons and a taskbar.

# log-файлы веб-сервера Apache и системный log-файл

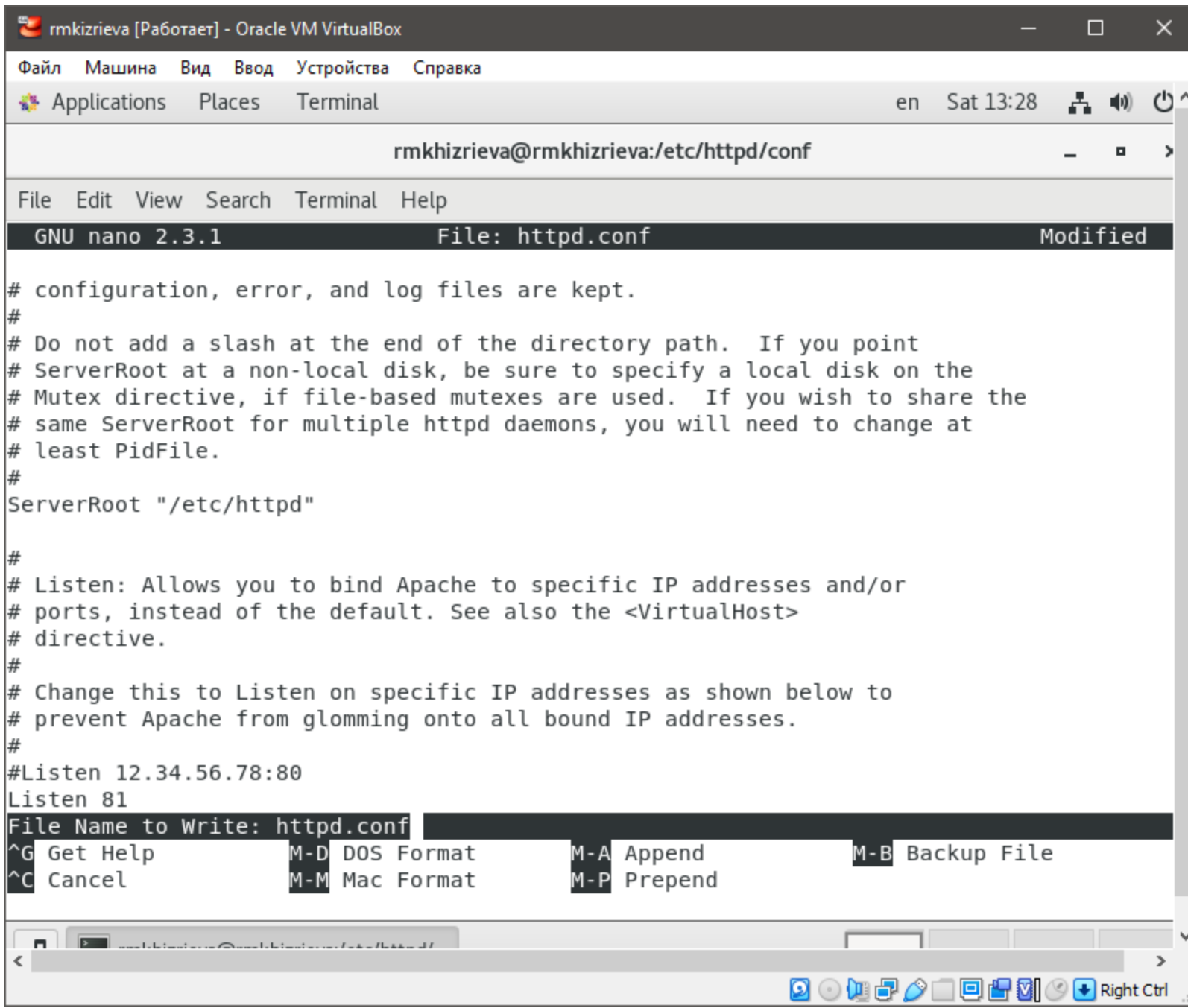


```
rmkhizrieva [Работает] - Oracle VM VirtualBox
Файл  Машина  Вид  Ввод  Устройства  Справка
Applications  Places  Terminal  en  Sat 13:25
rmkhizrieva@rmkhizrieva:/home/rmkhizrieva

File  Edit  View  Search  Terminal  Help

[rmkhizrieva@rmkhizrieva ~]$ ls -l /var/www/html/test.html
-rw-r--r--. 1 root root 33 Oct 15 12:46 /var/www/html/test.html
[rmkhizrieva@rmkhizrieva ~]$ tail /var/log/message
tail: cannot open '/var/log/message' for reading: No such file or directory
[rmkhizrieva@rmkhizrieva ~]$ su root
Password:
[root@rmkhizrieva rmkhizrieva]# tail /var/log/message
tail: cannot open '/var/log/message' for reading: No such file or directory
[root@rmkhizrieva rmkhizrieva]# tail /var/log/messages
Oct 15 13:21:32 rmkhizrieva systemd: Starting Fingerprint Authentication Daemon...
Oct 15 13:21:32 rmkhizrieva dbus[685]: [system] Successfully activated service 'net.reactivated.Fprint'
Oct 15 13:21:32 rmkhizrieva systemd: Started Fingerprint Authentication Daemon.
Oct 15 13:24:36 rmkhizrieva dbus[685]: [system] Activating via systemd: service name='net.reactivated.Fprint' unit='fprintd.service'
Oct 15 13:24:36 rmkhizrieva systemd: Starting Fingerprint Authentication Daemon...
Oct 15 13:24:36 rmkhizrieva dbus[685]: [system] Successfully activated service 'net.reactivated.Fprint'
Oct 15 13:24:36 rmkhizrieva systemd: Started Fingerprint Authentication Daemon.
Oct 15 13:24:40 rmkhizrieva su: (to root) rmkhizrieva on pts/0
Oct 15 13:24:40 rmkhizrieva dbus[685]: [system] Activating service name='org.freedesktop.problems' (using servicehelper)
Oct 15 13:24:40 rmkhizrieva dbus[685]: [system] Successfully activated service 'org.freedesktop.problems'
[root@rmkhizrieva rmkhizrieva]#
```

# Запуск веб-сервера Араче на прослушивание TCP-порта 81

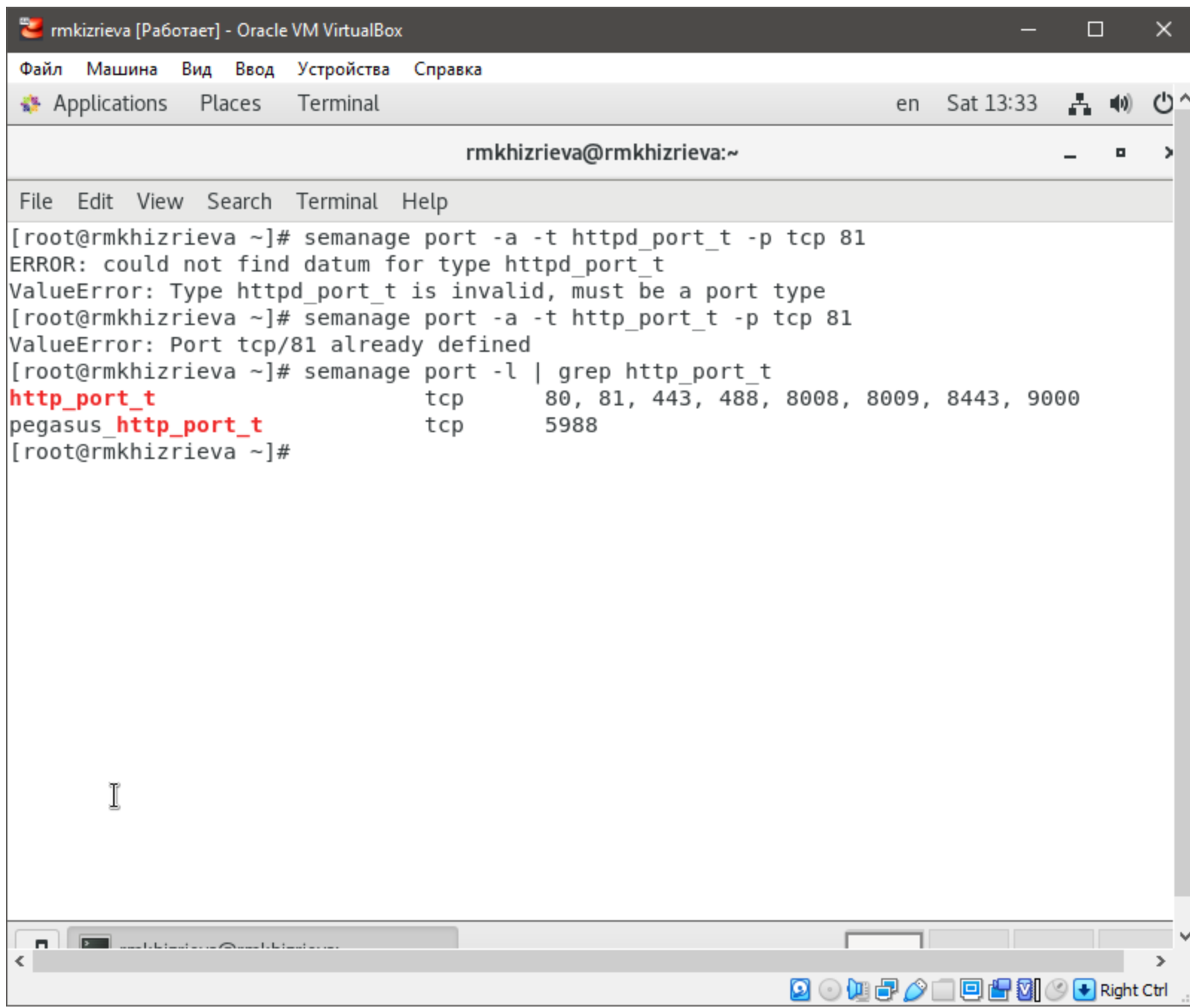


```
rmkhizrieva [Работает] - Oracle VM VirtualBox
Файл  Машина  Вид  Ввод  Устройства  Справка
Applications  Places  Terminal  en  Sat 13:28
rmkhizrieva@rmkhizrieva:/etc/httpd/conf
File  Edit  View  Search  Terminal  Help
GNU nano 2.3.1  File: httpd.conf  Modified

# configuration, error, and log files are kept.
#
# Do not add a slash at the end of the directory path.  If you point
# ServerRoot at a non-local disk, be sure to specify a local disk on the
# Mutex directive, if file-based mutexes are used.  If you wish to share the
# same ServerRoot for multiple httpd daemons, you will need to change at
# least PidFile.
#
ServerRoot "/etc/httpd"

#
# Listen: Allows you to bind Apache to specific IP addresses and/or
# ports, instead of the default.  See also the <VirtualHost>
# directive.
#
# Change this to Listen on specific IP addresses as shown below to
# prevent Apache from glomming onto all bound IP addresses.
#
#Listen 12.34.56.78:80
Listen 81
File Name to Write: httpd.conf
^G Get Help      M-D DOS Format   M-A Append      M-B Backup File
^C Cancel        M-M Mac Format   M-P Prepend
```

# Вывод списка портов

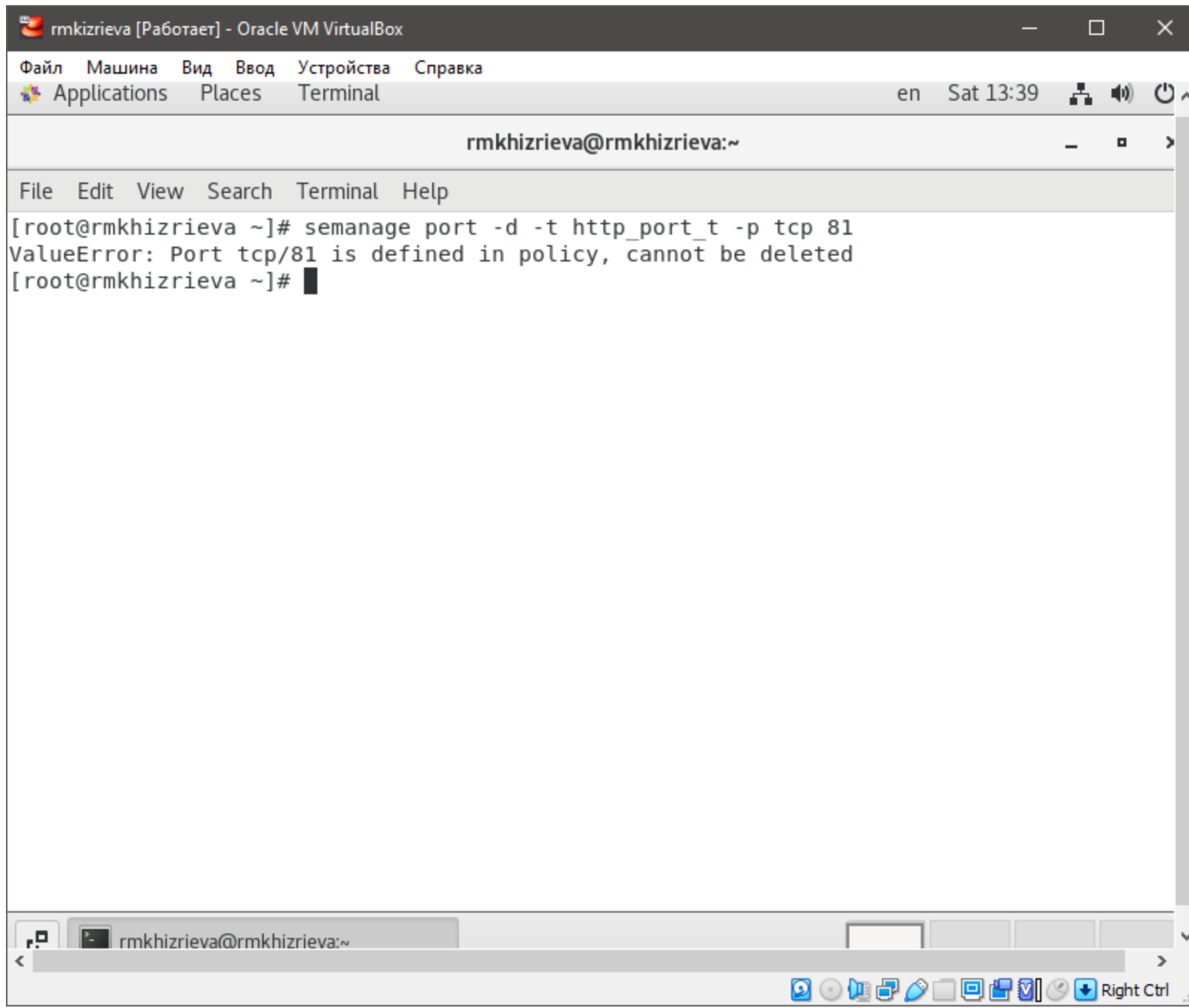


The screenshot shows a terminal window titled "rmkizrieva [Работает] - Oracle VM VirtualBox". The window has a menu bar with "Файл", "Машина", "Вид", "Ввод", "Устройства", and "Справка". Below the menu bar is a toolbar with "Applications", "Places", and "Terminal". The terminal itself has a title bar "rmkhizrieva@rmkhizrieva:~" and a menu bar with "File", "Edit", "View", "Search", "Terminal", and "Help". The terminal content shows the following commands and output:

```
[root@rmkhizrieva ~]# semanage port -a -t httpd_port_t -p tcp 81
ERROR: could not find datum for type httpd_port_t
ValueError: Type httpd_port_t is invalid, must be a port type
[root@rmkhizrieva ~]# semanage port -a -t http_port_t -p tcp 81
ValueError: Port tcp/81 already defined
[root@rmkhizrieva ~]# semanage port -l | grep http_port_t
http_port_t                tcp      80, 81, 443, 488, 8008, 8009, 8443, 9000
pegasus_http_port_t        tcp      5988
[root@rmkhizrieva ~]#
```

The terminal window has a status bar at the bottom with icons for various applications and a "Right Ctrl" button.

# Возвращение контекста



The screenshot shows a terminal window titled "rmkizrieva [Работает] - Oracle VM VirtualBox". The window has a menu bar with "Файл", "Машина", "Вид", "Ввод", "Устройства", and "Справка". Below the menu bar is a toolbar with "Applications", "Places", and "Terminal". The terminal prompt is "rmkhizrieva@rmkhizrieva:~". The terminal output shows the command "[root@rmkhizrieva ~]# semanage port -d -t http\_port\_t -p tcp 81" and the error message "ValueError: Port tcp/81 is defined in policy, cannot be deleted". The terminal window has a title bar with "File", "Edit", "View", "Search", "Terminal", and "Help". The bottom of the window shows a taskbar with various icons and a "Right Ctrl" button.

```
rmkizrieva [Работает] - Oracle VM VirtualBox
Файл  Машина  Вид  Ввод  Устройства  Справка
Applications  Places  Terminal  en  Sat 13:39
rmkhizrieva@rmkhizrieva:~
File  Edit  View  Search  Terminal  Help
[root@rmkhizrieva ~]# semanage port -d -t http_port_t -p tcp 81
ValueError: Port tcp/81 is defined in policy, cannot be deleted
[root@rmkhizrieva ~]#
```

# Выводы по проделанной работе

## Вывод

В результате проделанной лабораторной работы были развиты навыки администрирования ОС Linux, получено первое практическое знакомство с технологией SELinux, а также была проверена работа SELinux на практике совместно с веб-сервером Apache.