

Лабораторная работа №5

Управление системными службами

Эзиз Хатамов

24 сентября 2025

Российский университет дружбы народов, Москва, Россия

Цель работы

Получить навыки управления системными службами операционной системы посредством `systemd`.

Ход выполнения работы

Управление сервисами (1)

- Проверка статуса `vsftpd` → сервис не установлен
- Установка службы через `dnf`

```
ehatamov@ehatanov:~$ su
Password:
root@ehatanov:/home/ehatanov# systemctl status vsftpd
Unit vsftpd.service could not be found.
root@ehatanov:/home/ehatanov# dnf -y install vsftpd
Rocky Linux 10 - BaseOS                               5.6 kB/s | 3.9 kB   00:00
Rocky Linux 10 - BaseOS                               31 MB/s | 18 MB   00:00
Rocky Linux 10 - AppStream                             13 kB/s | 3.9 kB   00:00
Rocky Linux 10 - Extras                               10 kB/s | 3.1 kB   00:00
Rocky Linux 10 - Extras                               16 kB/s | 5.1 kB   00:00
Dependencies resolved.
=====
Package                Architecture      Version           Repository        Size
-----
Installing:
vsftpd                 x86_64            3.0.5-9.el10     appstream         170 k
Transaction Summary
-----
Install 1 Package

Total download size: 170 k
Installed size: 348 k
Downloading Packages:
vsftpd-3.0.5-9.el10.x86_64.rpm                        58 kB/s | 170 kB   00:02
-----
Total                                                    53 kB/s | 170 kB   00:03
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing      :                                1/1
  Installing    : vsftpd-3.0.5-9.el10.x86_64     1/1
  Running scriptlet: vsftpd-3.0.5-9.el10.x86_64   1/1

Installed:
vsftpd-3.0.5-9.el10.x86_64
```

- Запуск службы → статус **active (running)**
- Сервис не был включён в автозапуск

```
root@ehatamov:/home/ehatamov#  
root@ehatamov:/home/ehatamov# systemctl start vsftpd  
root@ehatamov:/home/ehatamov# systemctl status vsftpd  
● vsftpd.service - Vsftpd ftp daemon  
   Loaded: loaded (/usr/lib/systemd/system/vsftpd.service; disabled; preset: disabled)  
   Active: active (running) since Mon 2025-09-22 18:08:21 MSK; 2s ago  
  Invocation: 2e7a9da436f34e9984c72508b1455c4a  
    Process: 3640 ExecStart=/usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf (code=exited, status=0/SUCCESS)  
   Main PID: 3644 (vsftpd)  
      Tasks: 1 (limit: 24779)  
     Memory: 748K (peak: 1.3M)  
        CPU: 2ms  
    CGroup: /system.slice/vsftpd.service  
            └─3644 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf  
  
Sep 22 18:08:21 ehatamov.localdomain systemd[1]: Starting vsftpd.service - Vsftpd ftp daemon...  
Sep 22 18:08:21 ehatamov.localdomain systemd[1]: Started vsftpd.service - Vsftpd ftp daemon.  
root@ehatamov:/home/ehatamov# █
```

Рис. 2: Запуск службы vsftpd

- Добавление в автозапуск → статус **enabled**

```
root@ehatamov:/home/ehatamov#  
root@ehatamov:/home/ehatamov# systemctl enable vsftpd  
Created symlink '/etc/systemd/system/multi-user.target.wants/vsftpd.service' → '/usr/lib/systemd/system/vsftpd.service'.  
root@ehatamov:/home/ehatamov# systemctl status vsftpd  
● vsftpd.service - Vsftpd ftp daemon  
   Loaded: loaded (/usr/lib/systemd/system/vsftpd.service; enabled; preset: disabled)  
   Active: active (running) since Mon 2025-09-22 18:08:21 MSK; 51s ago  
  Invocation: 2e7a9da436f34e9984c72508b1455c4a  
    Main PID: 3644 (vsftpd)  
      Tasks: 1 (limit: 24779)  
     Memory: 748K (peak: 1.3M)  
        CPU: 2ms  
    CGroup: /system.slice/vsftpd.service  
            └─3644 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf  
  
Sep 22 18:08:21 ehatamov.localdomain systemd[1]: Starting vsftpd.service - Vsftpd ftp daemon...  
Sep 22 18:08:21 ehatamov.localdomain systemd[1]: Started vsftpd.service - Vsftpd ftp daemon.  
root@ehatamov:/home/ehatamov#
```

Рис. 3: Добавление vsftpd в автозапуск

- Удаление из автозапуска → статус **disabled**

```
root@ehatamov:/home/ehatamov# systemctl disable vsftpd
Removed '/etc/systemd/system/multi-user.target.wants/vsftpd.service'.
root@ehatamov:/home/ehatamov# systemctl status vsftpd
● vsftpd.service - Vsftpd ftp daemon
   Loaded: loaded (/usr/lib/systemd/system/vsftpd.service; disabled; preset: disabled)
   Active: active (running) since Mon 2025-09-22 18:08:21 MSK; 1min 18s ago
 Invocation: 2e7a9da436f34e9984c72508b1455c4a
   Main PID: 3644 (vsftpd)
     Tasks: 1 (limit: 24779)
    Memory: 748K (peak: 1.3M)
       CPU: 2ms
    CGroup: /system.slice/vsftpd.service
            └─3644 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf

Sep 22 18:08:21 ehatamov.localdomain systemd[1]: Starting vsftpd.service - Vsftpd ftp daemon...
Sep 22 18:08:21 ehatamov.localdomain systemd[1]: Started vsftpd.service - Vsftpd ftp daemon.
root@ehatamov:/home/ehatamov#
```

Рис. 4: Удаление vsftpd из автозапуска

Управление сервисами (4)

- Просмотр символических ссылок сервисов
- Повторное включение vsftpd в автозапуск
- Анализ зависимостей юнита

```
root@ehatamov:/home/ehatamov#
root@ehatamov:/home/ehatamov# ls /etc/systemd/system/multi-user.target.wants/
atd.service      cups.path        mcelog.service   rsyslog.service  vboxadd-service.service
auditd.service   cups.service     mdmonitor.service smartd.service    vmtoolsd.service
audit-rules.service firewallld.service ModemManager.service sshd.service
avahi-daemon.service irqbalance.service NetworkManager.service sssd.service
chronyd.service  kdump.service   remote-cryptsetup.target tuned.service
crond.service    libstoragemgmt.service remote-fs.target  vboxadd.service

root@ehatamov:/home/ehatamov# systemctl enable vsftpd
Created symlink '/etc/systemd/system/multi-user.target.wants/vsftpd.service' → '/usr/lib/systemd/system/vsftpd.service'.
root@ehatamov:/home/ehatamov# ls /etc/systemd/system/multi-user.target.wants/
atd.service      cups.path        mcelog.service   rsyslog.service  vboxadd-service.service
auditd.service   cups.service     mdmonitor.service smartd.service    vmtoolsd.service
audit-rules.service firewallld.service ModemManager.service sshd.service
avahi-daemon.service irqbalance.service NetworkManager.service sssd.service
chronyd.service  kdump.service   remote-cryptsetup.target tuned.service
crond.service    libstoragemgmt.service remote-fs.target  vboxadd.service

root@ehatamov:/home/ehatamov# systemctl status vsftpd
● vsftpd.service - Vsftpd ftp daemon
   Loaded: loaded (/usr/lib/systemd/system/vsftpd.service; enabled; preset: disabled)
   Active: active (running) since Mon 2025-09-22 18:08:21 MSK; 3min 8s ago
  Invocation: 2e7a9da436f34e9984c72508b1455c4a
    Main PID: 3644 (vsftpd)
      Tasks: 1 (limit: 24779)
     Memory: 748K (peak: 1.3M)
        CPU: 2ms
       CGroup: /system.slice/vsftpd.service
               └─3644 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf

Sep 22 18:08:21 ehatamov.localdomain systemd[1]: Starting vsftpd.service - Vsftpd ftp daemon...
Sep 22 18:08:21 ehatamov.localdomain systemd[1]: Started vsftpd.service - Vsftpd ftp daemon.
root@ehatamov:/home/ehatamov#
```

Конфликты юнитов (1)

- Проверка статуса `firewalld` и `iptables`
- `firewalld` → активно, `iptables` → неактивно

```
Installed:
  iptables-devel-1.8.11-8.el10_0.x86_64    iptables-nft-services-1.8.11-8.el10_0.noarch    iptables-utils-1.8.11-8.el10_0.x86_64

Complete!
root@ehatamov:/home/ehatamov# systemctl status firewalld.service
● firewalld.service - firewalld - dynamic firewall daemon
   Loaded: loaded (/usr/lib/systemd/system/firewalld.service; enabled; preset: enabled)
   Active: active (running) since Mon 2025-09-22 18:05:37 MSK; 8min ago
 Invocation: 95e31bbcdcc043cealde4501763a1a57
    Docs: man:firewalld(1)
   Main PID: 944 (firewalld)
     Tasks: 2 (limit: 24779)
    Memory: 50.1M (peak: 50.1M)
       CPU: 343ms
    CGroup: /system.slice/firewalld.service
            └─944 /usr/bin/python3 -sP /usr/sbin/firewalld --nofork --nopid

Sep 22 18:05:37 ehatamov.localdomain systemd[1]: Starting firewalld.service - firewalld - dynamic firewall daemon...
Sep 22 18:05:37 ehatamov.localdomain systemd[1]: Started firewalld.service - firewalld - dynamic firewall daemon.
root@ehatamov:/home/ehatamov# systemctl status iptables.service
○ iptables.service - IPv4 firewall with iptables
   Loaded: loaded (/usr/lib/systemd/system/iptables.service; disabled; preset: disabled)
   Active: inactive (dead)

root@ehatamov:/home/ehatamov#
```

Рис. 6: Статус `firewalld` и `iptables`

Конфликты юнитов (2)

- При запуске одного сервиса другой отключается
- Наличие конфликта подтверждено

```
root@ehatamov:/home/ehatamov#
root@ehatamov:/home/ehatamov# systemctl start firewalld
root@ehatamov:/home/ehatamov# systemctl start iptables
root@ehatamov:/home/ehatamov# systemctl status firewalld.service
○ firewalld.service - firewalld - dynamic firewall daemon
  Loaded: loaded (/usr/lib/systemd/system/firewalld.service; enabled; preset: enabled)
  Active: inactive (dead) since Mon 2025-09-22 18:14:27 MSK; 2s ago
  Duration: 8min 49.373s
  Invocation: 95e31bbcdcc043cea1de4501763a1a57
  Docs: man:firewalld(1)
  Process: 944 ExecStart=/usr/sbin/firewalld --nofork --nopid $FIREWALLD_ARGS (code=exited, status=0/SUCCESS)
  Main PID: 944 (code=exited, status=0/SUCCESS)
  Mem peak: 50.4M
  CPU: 359ms

Sep 22 18:05:37 ehatamov.localdomain systemd[1]: Starting firewalld.service - firewalld - dynamic firewall daemon...
Sep 22 18:05:37 ehatamov.localdomain systemd[1]: Started firewalld.service - firewalld - dynamic firewall daemon...
Sep 22 18:14:27 ehatamov.localdomain systemd[1]: Stopping firewalld.service - firewalld - dynamic firewall daemon...
Sep 22 18:14:27 ehatamov.localdomain systemd[1]: firewalld.service: Deactivated successfully.
Sep 22 18:14:27 ehatamov.localdomain systemd[1]: Stopped firewalld.service - firewalld - dynamic firewall daemon.
root@ehatamov:/home/ehatamov# systemctl status iptables.service
● iptables.service - IPv4 firewall with iptables
  Loaded: loaded (/usr/lib/systemd/system/iptables.service; disabled; preset: disabled)
  Active: active (exited) since Mon 2025-09-22 18:14:27 MSK; 6s ago
  Invocation: b2ff3d8b58084289ba34ab5607dadf24
  Process: 5110 ExecStart=/usr/libexec/iptables/iptables.init start (code=exited, status=0/SUCCESS)
  Main PID: 5110 (code=exited, status=0/SUCCESS)
  Mem peak: 1.6M
  CPU: 7ms

Sep 22 18:14:27 ehatamov.localdomain systemd[1]: Starting iptables.service - IPv4 firewall with iptables...
Sep 22 18:14:27 ehatamov.localdomain iptables.init[5110]: iptables: Applying firewall rules: [ OK ]
Sep 22 18:14:27 ehatamov.localdomain systemd[1]: Finished iptables.service - IPv4 firewall with iptables.
root@ehatamov:/home/ehatamov#
```

Конфликты юнитов (3)

- Просмотр файла `firewalld.service`
- Обнаружены настройки конфликтов

```
root@ehatamov:/home/ehatamov# cat /usr/lib/systemd/system/firewalld.service
[Unit]
Description=firewalld - dynamic firewall daemon
Before=network-pre.target
Wants=network-pre.target
After=dbus.service
After=polkit.service
Conflicts=iptables.service ip6tables.service ebtables.service ipset.service
Documentation=man:firewalld(1)

[Service]
EnvironmentFile=-/etc/sysconfig/firewalld
ExecStart=/usr/sbin/firewalld --nofork --nopid $FIREWALLD_ARGS
ExecReload=/bin/kill -HUP $MAINPID
# supress to log debug and error output also to /var/log/messages
StandardOutput=null
StandardError=null
Type=dbus
BusName=org.fedoraproject.FirewallD1
KillMode=mixed
DevicePolicy=closed
KeyringMode=private
LockPersonality=yes
MemoryDenyWriteExecute=yes
PrivateDevices=yes
ProtectClock=yes
ProtectControlGroups=yes
ProtectHome=yes
ProtectHostname=yes
ProtectKernelLogs=yes
ProtectKernelModules=no
ProtectKernelTunables=no
ProtectSystem=yes
```

- Просмотр файла `iptables.service`
- Настроек конфликтов не найдено

```
root@ehatamov:/home/ehatamov#  
root@ehatamov:/home/ehatamov# cat /usr/lib/systemd/system/iptables.service  
[Unit]  
Description=IPv4 firewall with iptables  
AssertPathExists=/etc/sysconfig/iptables  
Before=network-pre.target  
Wants=network-pre.target  
  
[Service]  
Type=oneshot  
RemainAfterExit=yes  
ExecStart=/usr/libexec/iptables/iptables.init start  
ExecReload=/usr/libexec/iptables/iptables.init reload  
ExecStop=/usr/libexec/iptables/iptables.init stop  
Environment=BOOTUP=serial  
Environment=CONSOLETYPE=serial  
  
[Install]  
WantedBy=multi-user.target  
root@ehatamov:/home/ehatamov#
```

Конфликты юнитов (5)

- Сервис iptables замаскирован
- Попытка запуска приводит к ошибке

```
root@ehatamov:/home/ehatamov# systemctl stop iptables
root@ehatamov:/home/ehatamov# systemctl start firewalld
root@ehatamov:/home/ehatamov# systemctl mask iptables
Created symlink '/etc/systemd/system/iptables.service' → '/dev/null'.
root@ehatamov:/home/ehatamov# systemctl start iptables
Failed to start iptables.service: Unit iptables.service is masked.
root@ehatamov:/home/ehatamov# systemctl enable iptables
Failed to enable unit: Unit /etc/systemd/system/iptables.service is masked
root@ehatamov:/home/ehatamov# systemctl status iptables.service
○ iptables.service
   Loaded: masked (Reason: Unit iptables.service is masked.)
   Active: inactive (dead) since Mon 2025-09-22 18:17:08 MSK; 1min 5s ago
   Duration: 2min 41.003s
   Invocation: b2ff3d8b58084289ba34ab5607dadf24
   Main PID: 5110 (code=exited, status=0/SUCCESS)
   Mem peak: 2M
   CPU: 41ms

Sep 22 18:14:27 ehatamov.localdomain systemd[1]: Starting iptables.service - IPv4 firewall with iptables...
Sep 22 18:14:27 ehatamov.localdomain iptables.init[5110]: iptables: Applying firewall rules: [ OK ]
Sep 22 18:14:27 ehatamov.localdomain systemd[1]: Finished iptables.service - IPv4 firewall with iptables.
Sep 22 18:17:08 ehatamov.localdomain systemd[1]: Stopping iptables.service - IPv4 firewall with iptables...
Sep 22 18:17:08 ehatamov.localdomain iptables.init[5483]: iptables: Setting chains to policy ACCEPT: raw mangle filter nat [ OK ]
Sep 22 18:17:08 ehatamov.localdomain iptables.init[5483]: iptables: Flushing firewall rules: [ OK ]
Sep 22 18:17:08 ehatamov.localdomain systemd[1]: iptables.service: Deactivated successfully.
Sep 22 18:17:08 ehatamov.localdomain systemd[1]: Stopped iptables.service - IPv4 firewall with iptables.
root@ehatamov:/home/ehatamov#
```

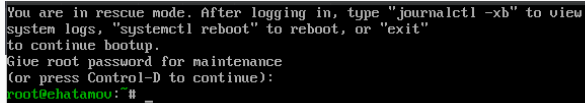
Рис. 10: Замаскированный сервис iptables

Изолируемые цели (1)

- Получен список изолируемых целей (AllowIsolate=yes)

```
root@ehatamov: /home/ehatamov#  
root@ehatamov:/home/ehatamov# cd /usr/lib/systemd/system  
root@ehatamov:/usr/lib/systemd/system# grep Isolate *.target  
ctrl-alt-del.target:AllowIsolate=yes  
default.target:AllowIsolate=yes  
emergency.target:AllowIsolate=yes  
exit.target:AllowIsolate=yes  
graphical.target:AllowIsolate=yes  
halt.target:AllowIsolate=yes  
initrd-switch-root.target:AllowIsolate=yes  
initrd.target:AllowIsolate=yes  
kexec.target:AllowIsolate=yes  
multi-user.target:AllowIsolate=yes  
poweroff.target:AllowIsolate=yes  
reboot.target:AllowIsolate=yes  
rescue.target:AllowIsolate=yes  
runlevel0.target:AllowIsolate=yes  
runlevel1.target:AllowIsolate=yes  
runlevel2.target:AllowIsolate=yes  
runlevel3.target:AllowIsolate=yes  
runlevel4.target:AllowIsolate=yes  
runlevel5.target:AllowIsolate=yes  
runlevel6.target:AllowIsolate=yes  
soft-reboot.target:AllowIsolate=yes  
system-update.target:AllowIsolate=yes  
root@ehatamov:/usr/lib/systemd/system#
```

- Переключение в `rescue.target`
- Требуется пароль root

A terminal window with a black background and white text. The text shows the rescue mode boot process: 'You are in rescue mode. After logging in, type "journalctl -xb" to view system logs, "systemctl reboot" to reboot, or "exit" to continue bootup. Give root password for maintenance (or press Control-D to continue):' followed by a green prompt 'root@chatamov:~# _' where the underscore indicates a password has been entered.

```
You are in rescue mode. After logging in, type "journalctl -xb" to view
system logs, "systemctl reboot" to reboot, or "exit"
to continue bootup.
Give root password for maintenance
(or press Control-D to continue):
root@chatamov:~# _
```

Рис. 12: Режим восстановления

- Переключение в `reboot.target`
- Система перезапущена

```
ehatamov@ehatamov:~$ su
Password:
root@ehatamov:/home/ehatamov# systemctl get-default
graphical.target
root@ehatamov:/home/ehatamov# systemctl set-default multi-user.target
Removed '/etc/systemd/system/default.target'.
Created symlink '/etc/systemd/system/default.target' → '/usr/lib/systemd/system/multi-user.target'.
root@ehatamov:/home/ehatamov# █
```

Рис. 13: Перезапуск системы

- Проверка цели по умолчанию → `graphical.target`

```
ehatamov@ehatamov:~$ su
Password:
root@ehatamov:/home/ehatamov# systemctl get-default
graphical.target
root@ehatamov:/home/ehatamov# systemctl set-default multi-user.target
Removed '/etc/systemd/system/default.target'.
Created symlink '/etc/systemd/system/default.target' → '/usr/lib/systemd/system/multi-user.target'.
root@ehatamov:/home/ehatamov#
```

Рис. 14: Проверка цели по умолчанию

Цель по умолчанию (2)

- Установка `multi-user.target` → загрузка в текстовом режиме
- Возврат к `graphical.target`

```
ehatamov@ehatamov:~$ su
Password:
root@ehatamov:/home/ehatamov# systemctl get-default
graphical.target
root@ehatamov:/home/ehatamov# systemctl set-default multi-user.target
Removed '/etc/systemd/system/default.target'.
Created symlink '/etc/systemd/system/default.target' → '/usr/lib/systemd/system/multi-user.target'.
root@ehatamov:/home/ehatamov#
```

```
Rocky Linux 10.0 (Red Quartz)
Kernel 6.12.0-55.12.1.el10_0.x86_64 on x86_64

Web console: https://ehatamov.localdomain:9898/ or https://10.0.2.15:9898/

ehatamov login: root
Password:
Last login: Mon Sep 22 18:22:19 on pts/0
root@ehatamov:~# systemctl get-default
multi-user.target
root@ehatamov:~# systemctl set-default graphical.target
Removed '/etc/systemd/system/default.target'.
Created symlink '/etc/systemd/system/default.target' → '/usr/lib/systemd/system/graphical.target'.
root@ehatamov:~# _
```

Итоги работы

- Изучено управление сервисами через **systemd**
- Разобраны конфликты юнитов (**firewalld ↔ iptables**)
- Освоено использование изолируемых целей и изменение цели по умолчанию
- Получены навыки анализа зависимостей и настройки автозапуска