

Лабораторная работа №5

Управление системными службами

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Цель работы

Получить навыки управления системными службами операционной системы посредством systemd.

Ход выполнения

```
admazurkevich@admazurkevich:~$ su
Password:
root@admazurkevich:/home/admazurkevich# systemctl status vsftpd
Unit vsftpd.service could not be found.
root@admazurkevich:/home/admazurkevich# dnf -y install vsftpd
Rocky Linux 10 - BaseOS                    5.9 kB/s | 3.9 kB    00:00
Rocky Linux 10 - BaseOS                    26 MB/s | 18 MB     00:00
Rocky Linux 10 - AppStream                 2.3 kB/s | 3.9 kB    00:01
Rocky Linux 10 - AppStream                 1.0 MB/s | 2.1 MB    00:01
Rocky Linux 10 - Extras                    11 kB/s | 3.1 kB     00:00
Rocky Linux 10 - Extras                    11 kB/s | 4.9 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              973 kB/s | 170 kB    00:00
-----
Total                                         381 kB/s | 170 kB    00:00
Running transaction check
Transaction check succeeded.
```

Рис. 1: Проверка статуса vsftpd и установка пакета

```
root@admazurkevich:/home/admazurkevich#  
root@admazurkevich:/home/admazurkevich# systemctl start vsftpd  
root@admazurkevich:/home/admazurkevich# systemctl status vsftpd  
● vsftpd.service - Vsftpd ftp daemon  
   Loaded: loaded (/usr/lib/systemd/system/vsftpd.service; disabled; preset: disabled)  
   Active: active (running) since Sun 2025-09-21 15:21:58 MSK; 6s ago  
 Invocation: 9e7328f435864233943e6d54d9210004  
   Process: 3561 ExecStart=/usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf (code=exited, status=0/SUCCESS)  
  Main PID: 3562 (vsftpd)  
    Tasks: 1 (limit: 24779)  
   Memory: 748K (peak: 1.1M)  
      CPU: 3ms  
   CGroup: /system.slice/vsftpd.service  
           └─3562 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf  
  
Sep 21 15:21:58 admazurkevich.localdomain systemd[1]: Starting vsftpd.service - Vsftpd ftp daemon...  
Sep 21 15:21:58 admazurkevich.localdomain systemd[1]: Started vsftpd.service - Vsftpd ftp daemon.  
root@admazurkevich:/home/admazurkevich#
```

Рис. 2: Запуск и проверка статуса vsftpd

```
root@admazurkevich:/home/admazurkevich# systemctl enable vsftpd
Created symlink '/etc/systemd/system/multi-user.target.wants/vsftpd.service' → '/usr/lib/systemd/system/vsftpd.service'.
root@admazurkevich:/home/admazurkevich# systemctl status vsftpd
● vsftpd.service - Vsftpd ftp daemon
   Loaded: loaded (/usr/lib/systemd/system/vsftpd.service; enabled; preset: disabled)
   Active: active (running) since Sun 2025-09-21 15:21:58 MSK; 2min 29s ago
 Invocation: 9e7328f435864233943e6d54d9210004
    Main PID: 3562 (vsftpd)
      Tasks: 1 (limit: 24779)
     Memory: 748K (peak: 1.1M)
        CPU: 3ms
    CGroup: /system.slice/vsftpd.service
            └─3562 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf

Sep 21 15:21:58 admazurkevich.localdomain systemd[1]: Starting vsftpd.service - Vsftpd ftp daemon...
Sep 21 15:21:58 admazurkevich.localdomain systemd[1]: Started vsftpd.service - Vsftpd ftp daemon.
root@admazurkevich:/home/admazurkevich#
```

Рис. 3: Включение и отключение автозапуска vsftpd

```
-----
root@admazurkevich:/home/admazurkevich# systemctl disable vsftpd
Removed '/etc/systemd/system/multi-user.target.wants/vsftpd.service'.
root@admazurkevich:/home/admazurkevich# systemctl status vsftpd
● vsftpd.service - Vsftpd ftp daemon
   Loaded: loaded (/usr/lib/systemd/system/vsftpd.service; disabled; preset: disabled)
   Active: active (running) since Sun 2025-09-21 15:21:58 MSK; 3min 12s ago
 Invocation: 9e7328f435864233943e6d54d9210004
    Main PID: 3562 (vsftpd)
      Tasks: 1 (limit: 24779)
     Memory: 748K (peak: 1.1M)
        CPU: 3ms
     CGroup: /system.slice/vsftpd.service
            └─3562 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf

Sep 21 15:21:58 admazurkevich.localdomain systemd[1]: Starting vsftpd.service - Vsftpd ftp daemon...
Sep 21 15:21:58 admazurkevich.localdomain systemd[1]: Started vsftpd.service - Vsftpd ftp daemon.
root@admazurkevich:/home/admazurkevich#
```

Рис. 4: Отключение автозапуска vsftpd


```
root@admazurkevich:/home/admazurkevich# 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 firewalld.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@admazurkevich:/home/admazurkevich# systemctl enable vsftpd
Created symlink '/etc/systemd/system/multi-user.target.wants/vsftpd.service' → '/usr/lib/systemd/system/vsftpd.service'.
root@admazurkevich:/home/admazurkevich# 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 firewalld.service ModemManager.service sshd.service      vsftpd.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@admazurkevich:/home/admazurkevich#
```

Рис. 5: Проверка наличия симлинка и добавление vsftpd в автозапуск

```
● └─plymouth-start.service
● └─proc-sys-fs-binfmt_misc.automount
○ └─selinux-autorelabel-mark.service
● └─sys-fs-fuse-connections.mount
● └─sys-kernel-config.mount
● └─sys-kernel-debug.mount
● └─sys-kernel-tracing.mount
○ └─systemd-ask-password-console.path
○ └─systemd-binfmt.service
○ └─systemd-boot-random-seed.service
○ └─systemd-confext.service
○ └─systemd-firstboot.service
○ └─systemd-hibernate-clear.service
○ └─systemd-hwdb-update.service
○ └─systemd-journal-catalog-update.service
● └─systemd-journal-flush.service
● └─systemd-journald.service
○ └─systemd-machine-id-commit.service
root@admazurkevich:/home/admazurkevich# systemctl list-dependencies vsftpd --reverse
vsftpd.service
● └─multi-user.target
● └─graphical.target
root@admazurkevich:/home/admazurkevich#
```

Рис. 6: Зависимости vsftpd

```
root@admazurkevich:/home/admazurkevich# 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 Sun 2025-09-21 15:20:07 MSK; 10min ago
 Invocation: 0c22e71ac1994a7692366deaba0d539c
    Docs: man:firewalld(1)
   Main PID: 951 (firewalld)
     Tasks: 2 (limit: 24779)
    Memory: 49.2M (peak: 51.2M)
       CPU: 252ms
    CGroup: /system.slice/firewalld.service
           └─951 /usr/bin/python3 -sP /usr/sbin/firewalld --nofork --nopid

Sep 21 15:20:07 admazurkevich.localdomain systemd[1]: Starting firewalld.service - firewalld - dynamic firewall daemon:
Sep 21 15:20:07 admazurkevich.localdomain systemd[1]: Started firewalld.service - firewalld - dynamic firewall daemon:
root@admazurkevich:/home/admazurkevich# systemctl status iptables.service
O iptables.service - IPv4 firewall with iptables
   Loaded: loaded (/usr/lib/systemd/system/iptables.service; disabled; preset: disabled)
   Active: inactive (dead)
root@admazurkevich:/home/admazurkevich#
```

Рис. 7: Статус firewalld и iptables

```
root@admazurkevich:/home/admazurkevich# systemctl start firewalld
root@admazurkevich:/home/admazurkevich# systemctl start iptables
root@admazurkevich:/home/admazurkevich# 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 Sun 2025-09-21 15:31:22 MSK; 2s ago
  Duration: 11min 15.153s
  Invocation: 0c22e71ac1994a7692366deaba0d539c
  Docs: man:firewalld(1)
  Process: 951 ExecStart=/usr/sbin/firewalld --nofork --nopid $FIREWALLD_ARGS (code=exited, status=0/SUCCESS)
  Main PID: 951 (code=exited, status=0/SUCCESS)
  Mem peak: 51.2M
  CPU: 267ms

Sep 21 15:20:07 admazurkevich.localdomain systemd[1]: Starting firewalld.service - firewalld - dynamic firewall daemo
Sep 21 15:20:07 admazurkevich.localdomain systemd[1]: Started firewalld.service - firewalld - dynamic firewall daemo
Sep 21 15:31:22 admazurkevich.localdomain systemd[1]: Stopping firewalld.service - firewalld - dynamic firewall daemo
Sep 21 15:31:22 admazurkevich.localdomain systemd[1]: firewalld.service: Deactivated successfully.
Sep 21 15:31:22 admazurkevich.localdomain systemd[1]: Stopped firewalld.service - firewalld - dynamic firewall daemo
root@admazurkevich:/home/admazurkevich# 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 Sun 2025-09-21 15:31:22 MSK; 5s ago
  Invocation: ff270ff42c034972b7bcca023374edd7
  Process: 5551 ExecStart=/usr/libexec/iptables/iptables.init start (code=exited, status=0/SUCCESS)
  Main PID: 5551 (code=exited, status=0/SUCCESS)
  Mem peak: 1.6M
  CPU: 8ms

Sep 21 15:31:22 admazurkevich.localdomain systemd[1]: Starting iptables.service - IPv4 firewall with iptables...
Sep 21 15:31:22 admazurkevich.localdomain iptables.init[5551]: iptables: Applying firewall rules: [ OK ]
Sep 21 15:31:22 admazurkevich.localdomain systemd[1]: Finished iptables.service - IPv4 firewall with iptables.
root@admazurkevich:/home/admazurkevich# q
```

Рис. 8: Запуск firewalld и iptables

Конфликты юнитов

```
root@admazurkevich:/home/admazurkevich# 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
```

```
# suppress 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
```

```
root@admazurkevich: /home/admazurkevich# 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@admazurkevich: /home/admazurkevich#
```

Рис. 10: Конфигурация iptables.service

```
root@admazurkevich:/home/admazurkevich#
root@admazurkevich:/home/admazurkevich# systemctl stop iptables.service
root@admazurkevich:/home/admazurkevich# systemctl start firewalld.service
root@admazurkevich:/home/admazurkevich# systemctl mask iptables.service
Created symlink '/etc/systemd/system/iptables.service' → '/dev/null'.
root@admazurkevich:/home/admazurkevich# systemctl start iptables
Failed to start iptables.service: Unit iptables.service is masked.
root@admazurkevich:/home/admazurkevich# systemctl enable iptables
Failed to enable unit: Unit /etc/systemd/system/iptables.service is masked
root@admazurkevich:/home/admazurkevich# systemctl status iptables
○ iptables.service
   Loaded: masked (Reason: Unit iptables.service is masked.)
   Active: inactive (dead) since Sun 2025-09-21 15:35:13 MSK; 54s ago
   Duration: 3min 50.128s
   Invocation: ff270ff42c034972b7bcca023374edd7
   Main PID: 5551 (code=exited, status=0/SUCCESS)
   Mem peak: 2.1M
   CPU: 33ms

Sep 21 15:31:22 admazurkevich.localdomain systemd[1]: Starting iptables.service - IPv4 firewall with iptables...
Sep 21 15:31:22 admazurkevich.localdomain iptables.init[5551]: iptables: Applying firewall rules: [ OK ]
Sep 21 15:31:22 admazurkevich.localdomain systemd[1]: Finished iptables.service - IPv4 firewall with iptables.
Sep 21 15:35:12 admazurkevich.localdomain systemd[1]: Stopping iptables.service - IPv4 firewall with iptables...
Sep 21 15:35:13 admazurkevich.localdomain iptables.init[6160]: iptables: Setting chains to policy ACCEPT: raw mangle
Sep 21 15:35:13 admazurkevich.localdomain iptables.init[6160]: iptables: Flushing firewall rules: [ OK ]
Sep 21 15:35:13 admazurkevich.localdomain systemd[1]: iptables.service: Deactivated successfully.
Sep 21 15:35:13 admazurkevich.localdomain systemd[1]: Stopped iptables.service - IPv4 firewall with iptables.
root@admazurkevich:/home/admazurkevich#
```

Рис. 11: Маскирование и блокировка iptables

```
root@admazurkevich:/home/admazurkevich#  
root@admazurkevich:/home/admazurkevich# cd /usr/lib/systemd/system  
root@admazurkevich:/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@admazurkevich:/usr/lib/systemd/system#
```

Рис. 12: Поиск изолируемых целей


```
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@admazurkevich:~# systemctl isolate reboot.target _
```

Рис. 13: Переключение в rescue и reboot target

```
admazurkevich@admazurkevich:~$ su
Password:
root@admazurkevich:/home/admazurkevich# systemctl get-default
graphical.target
root@admazurkevich:/home/admazurkevich# 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@admazurkevich:/home/admazurkevich#
```

Рис. 14: Установка multi-user.target по умолчанию

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

Web console: https://admazurkevich.localdomain:9090/ or https://10.0.2.15:9090/

admazurkevich login: 123456
Password:
Login incorrect

admazurkevich login:
Password:
Login incorrect

admazurkevich login: root
Password:
Last login: Sun Sep 21 15:39:05 on pts/0
root@admazurkevich:~# systemctl get-default
multi-user.target
root@admazurkevich:~# 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@admazurkevich:~# _
```

Рис. 15: Установка graphical.target по умолчанию

Выводы по проделанной работе

В ходе лабораторной работы были изучены механизмы управления сервисами и целями в системе **systemd**:

- установка и запуск служб;
- добавление и удаление их из автозагрузки;
- анализ зависимостей и конфликтов между юнитами;
- работа с изолируемыми целями и смена цели по умолчанию.

Полученные навыки позволяют уверенно администрировать процессы и режимы работы операционной системы.