

# Лабораторная работа №5

Управление системными службами systemd

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## Цель работы

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Получить навыки управления системными службами и целями в операционной системе Linux с использованием systemd.

## Управление сервисами

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# Проверка статуса и установка vsftpd

```
root@titukaev:/home/titukaev# systemctl status vsftpd
root@titukaev:/home/titukaev# systemctl status vsftpd
Unit vsftpd.service could not be found.
root@titukaev:/home/titukaev# dnf -y install vsftpd
Rocky Linux 10 - BaseOS                               14 kB/s | 4.3 kB    00:00
Rocky Linux 10 - AppStream                             16 kB/s | 4.3 kB    00:00
Rocky Linux 10 - Extras                               13 kB/s | 3.1 kB    00:00
Dependencies resolved.
=====
Package                Architecture      Version           Repository        Size
=====
Installing:
vsftpd                 x86_64            3.0.5-10.el10    appstream         170 k
```

Рис. 1: Статус и установка vsftpd

Служба отсутствовала в системе — затем была установлена через DNF.

## Запуск и проверка работы службы

```
root@titukaev:/home/titukaev#  
root@titukaev:/home/titukaev# systemctl start vsftpd  
root@titukaev:/home/titukaev# systemctl status vsftpd  
● vsftpd.service - Vsftpd ftp daemon  
   Loaded: loaded (/usr/lib/systemd/system/vsftpd.service; disabled; preset: disabled)  
   Active: active (running) since Wed 2025-12-10 10:06:10 MSK; 2s ago  
 Invocation: 63118dd76c744a3b9f14f62cc2fb8434  
   Process: 4544 ExecStart=/usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf (code=exited, status=0/SUCCESS)  
  Main PID: 4545 (vsftpd)  
    Tasks: 1 (limit: 23136)  
   Memory: 860K (peak: 1.2M)  
      CPU: 3ms  
   CGroup: /system.slice/vsftpd.service  
           └─4545 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf  
  
Dec 10 10:06:10 titukaev.localdomain systemd[1]: Starting vsftpd.service - Vsftpd ftp daemon...  
Dec 10 10:06:10 titukaev.localdomain systemd[1]: Started vsftpd.service - Vsftpd ftp daemon.  
root@titukaev:/home/titukaev#
```

Рис. 2: Статус после запуска

После запуска **vsftpd** стала активной, но не включённой в автозагрузку.

# Управление автозапуском vsftpd

```
-----
root@titukaev:/home/titukaev# systemctl enable vsftpd
Created symlink '/etc/systemd/system/multi-user.target.wants/vsftpd.service' → '/usr/lib/systemd/system/vsftpd.service'.
root@titukaev:/home/titukaev# systemctl status vsftpd
● vsftpd.service - Vsftpd ftp daemon
   Loaded: loaded (/usr/lib/systemd/system/vsftpd.service; enabled; preset: disabled)
   Active: active (running) since Wed 2025-12-10 10:06:10 MSK; 37s ago
 Invocation: 63118dd76c744a3b9f14f62cc2fb8434
    Main PID: 4545 (vsftpd)
      Tasks: 1 (limit: 23136)
     Memory: 860K (peak: 1.2M)
        CPU: 3ms
    CGroup: /system.slice/vsftpd.service
            └─4545 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf

Dec 10 10:06:10 titukaev.localdomain systemd[1]: Starting vsftpd.service - Vsftpd ftp daemon...
Dec 10 10:06:10 titukaev.localdomain systemd[1]: Started vsftpd.service - Vsftpd ftp daemon.
root@titukaev:/home/titukaev# systemctl disable vsftpd
Removed '/etc/systemd/system/multi-user.target.wants/vsftpd.service'.
root@titukaev:/home/titukaev# systemctl status vsftpd
● vsftpd.service - Vsftpd ftp daemon
   Loaded: loaded (/usr/lib/systemd/system/vsftpd.service; disabled; preset: disabled)
   Active: active (running) since Wed 2025-12-10 10:06:10 MSK; 51s ago
 Invocation: 63118dd76c744a3b9f14f62cc2fb8434
    Main PID: 4545 (vsftpd)
      Tasks: 1 (limit: 23136)
     Memory: 860K (peak: 1.2M)
        CPU: 3ms
    CGroup: /system.slice/vsftpd.service
            └─4545 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf

Dec 10 10:06:10 titukaev.localdomain systemd[1]: Starting vsftpd.service - Vsftpd ftp daemon...
Dec 10 10:06:10 titukaev.localdomain systemd[1]: Started vsftpd.service - Vsftpd ftp daemon.
root@titukaev:/home/titukaev# █
```

Рис. 3: Enable/Disable vsftpd

# Создание символических ссылок для автозагрузки

```
root@titukaev:/home/titukaev#  
root@titukaev:/home/titukaev# ls /etc/systemd/system/multi-user.target.wants/  
atd.service          avahi-daemon.service  cups.path             httpd.service         libstoragemgmt.service  ModemManager.service  remote-fs.target  sshd.service  vboxadd.service  
audit-rules.service chtrond.service       cups.service          irqbalance.service   mcelog.service         NetworkManager.service  rsyslog.service  sssd.service  vboxadd-service.service  
audit-rules.service crond.service         firewallld.service    kdump.service        mdeonitor.service      remote-cryptsetup.target  smartd.service   tuned.service  vntoolsd.service  
root@titukaev:/home/titukaev# systemctl enable vsftpd  
Created symlink /etc/systemd/system/multi-user.target.wants/vsftpd.service' → '/usr/lib/systemd/system/vsftpd.service'.  
root@titukaev:/home/titukaev# ls /etc/systemd/system/multi-user.target.wants/  
atd.service          chtrond.service       firewallld.service    libstoragemgmt.service  NetworkManager.service  smartd.service  vboxadd.service  
audit-rules.service crond.service         httpd.service         mcelog.service         mdeonitor.service      remote-cryptsetup.target  sssd.service  vboxadd-service.service  
avahi-daemon.service cups.path             irqbalance.service    kdump.service          ModemManager.service   remote-fs.target  tuned.service  vntoolsd.service  
root@titukaev:/home/titukaev# systemctl status vsftpd  
● vsftpd.service - Vsftpd ftp daemon  
Loaded: loaded (/usr/lib/systemd/system/vsftpd.service; enabled; preset: disabled)  
Active: active (running) since Wed 2025-12-10 10:06:10 MSK; 2min 35s ago  
Invocation: 63118d576c744a3b9f14f62cc2fb8434  
Main PID: 4545 (vsftpd)  
Tasks: 1 (limit: 23136)  
Memory: 868K (peak: 1.2M)  
CPU: 3ms  
CGroup: /system.slice/vsftpd.service  
└─4545 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf  
  
Dec 10 10:06:10 titukaev.localdomain systemd[1]: Starting vsftpd.service - Vsftpd ftp daemon...  
Dec 10 10:06:10 titukaev.localdomain systemd[1]: Started vsftpd.service - Vsftpd ftp daemon.  
root@titukaev:/home/titukaev#
```

Рис. 4: Создание ссылки vsftpd

После `systemctl enable vsftpd` появилась ссылка в `multi-user.target.wants`.



## Зависимости юнита vsftpd

```
○ └─selinux-autotlabel-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-conext.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
● └─systemd-modules-load.service
● └─systemd-network-generator.service
○ └─systemd-pcrmachine.service
○ └─systemd-pcrphase-sysinit.service
○ └─systemd-pcrphase.service
○ └─systemd-pstore.service
● └─systemd-random-seed.service
root@titukaev:/home/titukaev# systemctl list-dependencies vsftpd --reverse
vsftpd.service
● └─multi-user.target
● └─graphical.target
root@titukaev:/home/titukaev#
```

Рис. 5: Зависимости vsftpd

## Конфликты юнитов

---

# Статусы firewalld и iptables

```
Upgraded:
iptables-libs-1.8.11-11.el10.x86_64                                iptables-nft-1.8.11-11.el10.x86_64
Installed:
iptables-devel-1.8.11-11.el10.x86_64    iptables-nft-services-1.8.11-11.el10.noarch    iptables-utils-1.8.11-11.el10.x86_64    kernel-modules-extra-matched-6.12.0-124.16.1.el10_1.x86_64

Complete!
root@titukaev:/home/titukaev# 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 Wed 2025-12-10 10:02:47 MSK; 9min ago
  Invocation: a97d04befd494f10b9ec456532d8e29b
     Docs: man:firewalld(1)
    Main PID: 1209 (firewalld)
       Tasks: 2 (limit: 23136)
    Memory: 50M (peak: 72M)
         CPU: 474ms
    CGroup: /system.slice/firewalld.service
            └─1209 /usr/bin/python3 -sP /usr/sbin/firewalld --nofork --nopid

Dec 10 10:02:44 titukaev.localdomain systemd[1]: Starting firewalld.service - firewalld - dynamic firewall daemon...
Dec 10 10:02:47 titukaev.localdomain systemd[1]: Started firewalld.service - firewalld - dynamic firewall daemon.
root@titukaev:/home/titukaev# 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@titukaev:/home/titukaev# systemctl start firewalld
root@titukaev:/home/titukaev# systemctl start iptables
root@titukaev:/home/titukaev#
```

Рис. 6: Статусы служб

Сервисы конфликтуют — одновременный запуск невозможен.

## Конфликты в файле firewalld.service

```
root@titukaev:/home/titukaev# 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
ExecStartPost=/usr/bin/firewall-cmd --state
# don't fail ExecStartPost on RUNNING_BUT_FAILED
SuccessExitStatus=251
ExecReload=/bin/kill -HUP $MAINPID
StandardOutput=null
StandardError=null
Type=dbus
BusName=org.fedoraproject.FirewallD1
KillMode=mixed
DevicePolicy=closed
KeyringMode=private
LoadDropOnExit=true
```

Рис. 7: Юнит firewalld

## Конфигурация iptables.service

```
root@titukaev:/home/titukaev#  
root@titukaev:/home/titukaev# 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@titukaev:/home/titukaev# █
```

Рис. 8: Юнит iptables

Структура юнита и условия его загрузки.

```
root@titukaev:/home/titukaev#  
root@titukaev:/home/titukaev# systemctl stop iptables.service  
root@titukaev:/home/titukaev# systemctl start firewalld.service  
root@titukaev:/home/titukaev# systemctl mask iptables.service  
Created symlink '/etc/systemd/system/iptables.service' → '/dev/null'.  
root@titukaev:/home/titukaev# systemctl start iptables  
Failed to start iptables.service: Unit iptables.service is masked.  
root@titukaev:/home/titukaev# systemctl enable iptables  
Failed to enable unit: Unit /etc/systemd/system/iptables.service is masked  
root@titukaev:/home/titukaev# █
```

Рис. 9: Маскирование iptables

Сервис замаскирован — запуск невозможен.

## Изолируемые цели

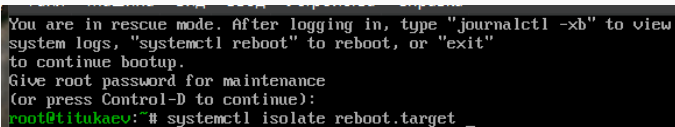
---

## Поиск целей с AllowIsolate=yes

```
root@titukaev:/home/titukaev#  
root@titukaev:/home/titukaev# cd /usr/lib/systemd/system  
root@titukaev:/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@titukaev:/usr/lib/systemd/system# systemctl isolate rescue.target
```

Рис. 10: Поиск изолируемых целей



A terminal window with a black background and white text. The text shows the system booting into rescue mode and the user entering a command to isolate the reboot.target.

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

Рис. 11: Переход в rescue.target

Система переведена в режим восстановления.

Система перезагружена через изоляцию цели `reboot`.

Цель по умолчанию

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## Проверка текущего режима загрузки

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

Рис. 12: Проверка default target

Определён текущий default target.

Система переведена на `multi-user.target`, выполнена перезагрузка.

```
Rocky Linux 10.0 (Red Quartz)
Kernel 6.12.0-55.39.1.el10_0.x86_64 on x86_64

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

titukaev login: root
Password:
Last login: Wed Dec 10 10:19:43 on pts/0
root@titukaev:~# systemctl get-default
multi-user.target
root@titukaev:~# 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@titukaev:~# reboot _
```

Рис. 13: Переключение на graphical.target

Установлен **graphical.target** как режим по умолчанию.

## Итоги работы

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Изучены механизмы управления службами и целями systemd, включая автозагрузку, зависимости, конфликты сервисов, изоляцию целей и изменение режима загрузки системы.