Лабораторная работа №5

Управление системными службами systemd

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Цель работы

Формулировка цели

Получить практические навыки управления системными службами и целями операционной системы с использованием системы инициализации systemd.

Ход выполнения работы

Проверка наличия службы vsftpd

```
ivschemelev@ivschemelev:~$ su
Password:
root@ivschemelev:/home/ivschemelev#
root@ivschemelev:/home/ivschemelev# systemctl status vsftpd
Unit vsftpd.service could not be found.
root@ivschemelev:/home/ivschemelev# dnf -y install vsftpd
Last metadata expiration check: 0:19:35 ago on Thu 15 Jan 2026 01:24:54 PM MSK.
Dependencies resolved.
================================================================================
 Package              Architecture          Version                  Repository                  Size
================================================================================
Installing:
 vsftpd               x86_64                3.0.5-10.el10            appstream                  170 k

Transaction Summary
================================================================================
Install  1 Package

Total download size: 170 k
Installed size: 344 k
Downloading Packages:
vsftpd-3.0.5-10.el10.x86_64.rpm                                 1.2 MB/s | 170 kB     00:00
--------------------------------------------------------------------------------
Total                                                           348 kB/s | 170 kB     00:00
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing        :                                                             1/1
  Installing       : vsftpd-3.0.5-10.el10.x86_64                                 1/1
  Running scriptlet: vsftpd-3.0.5-10.el10.x86_64                                 1/1

Installed:
  vsftpd-3.0.5-10.el10.x86_64
```

Запуск службы vsftpd

```
root@ivschemelev:/home/ivschemelev# systemctl start vsftpd
root@ivschemelev:/home/ivschemelev# systemctl status vsftpd
● vsftpd.service - Vsftpd ftp daemon
     Loaded: loaded (/usr/lib/systemd/system/vsftpd.service; disabled; preset: disabled)
     Active: active (running) since Thu 2026-01-15 13:44:53 MSK; 6s ago
 Invocation: 82ece123a2784c97972bfca6f1ded61e
    Process: 9881 ExecStart=/usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf (code=exited, status=0/SUCCESS)
   Main PID: 9884 (vsftpd)
      Tasks: 1 (limit: 23034)
     Memory: 864K (peak: 1.4M)
        CPU: 2ms
     CGroup: /system.slice/vsftpd.service
             └─9884 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf

Jan 15 13:44:53 ivschemelev.localdomain systemd[1]: Starting vsftpd.service - Vsftpd ftp daemon...
Jan 15 13:44:53 ivschemelev.localdomain systemd[1]: Started vsftpd.service - Vsftpd ftp daemon.
root@ivschemelev:/home/ivschemelev#
```

Рис. 2: Запуск и проверка состояния службы vsftpd

Управление автозапуском vsftpd

```
root@ivschemelev:/home/ivschemelev# systemctl enable vsftpd
Created symlink '/etc/systemd/system/multi-user.target.wants/vsftpd.service' → '/usr/lib/systemd/system/vsftpd.service'.
root@ivschemelev:/home/ivschemelev# systemctl status vsftpd
● vsftpd.service - Vsftpd ftp daemon
     Loaded: loaded (/usr/lib/systemd/system/vsftpd.service; enabled; preset: disabled)
     Active: active (running) since Thu 2026-01-15 13:44:53 MSK; 51s ago
 Invocation: 82ece123a2784c97972bfca6f1ded61e
   Main PID: 9884 (vsftpd)
      Tasks: 1 (limit: 23034)
     Memory: 864K (peak: 1.4M)
        CPU: 2ms
     CGroup: /system.slice/vsftpd.service
             └─9884 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf

Jan 15 13:44:53 ivschemelev.localdomain systemd[1]: Starting vsftpd.service - Vsftpd ftp daemon...
Jan 15 13:44:53 ivschemelev.localdomain systemd[1]: Started vsftpd.service - Vsftpd ftp daemon.
root@ivschemelev:/home/ivschemelev#
root@ivschemelev:/home/ivschemelev# systemctl disable vsftpd.service
Removed '/etc/systemd/system/multi-user.target.wants/vsftpd.service'.
root@ivschemelev:/home/ivschemelev# systemctl status vsftpd
● vsftpd.service - Vsftpd ftp daemon
     Loaded: loaded (/usr/lib/systemd/system/vsftpd.service; disabled; preset: disabled)
     Active: active (running) since Thu 2026-01-15 13:44:53 MSK; 1min 4s ago
 Invocation: 82ece123a2784c97972bfca6f1ded61e
   Main PID: 9884 (vsftpd)
      Tasks: 1 (limit: 23034)
     Memory: 864K (peak: 1.4M)
        CPU: 2ms
     CGroup: /system.slice/vsftpd.service
             └─9884 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf

Jan 15 13:44:53 ivschemelev.localdomain systemd[1]: Starting vsftpd.service - Vsftpd ftp daemon...
Jan 15 13:44:53 ivschemelev.localdomain systemd[1]: Started vsftpd.service - Vsftpd ftp daemon.
root@ivschemelev:/home/ivschemelev#
```

Повторное включение vsftpd в автозапуск

```
root@ivschemelev:/home/ivschemelev# 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@ivschemelev:/home/ivschemelev# systemctl enable vsftpd
Created symlink '/etc/systemd/system/multi-user.target.wants/vsftpd.service' → '/usr/lib/systemd/system/vsftpd.service'.
root@ivschemelev:/home/ivschemelev# 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@ivschemelev:/home/ivschemelev# systemctl status vsftpd
● vsftpd.service - Vsftpd ftp daemon
     Loaded: loaded (/usr/lib/systemd/system/vsftpd.service; enabled; preset: disabled)
     Active: active (running) since Thu 2026-01-15 13:44:53 MSK; 2min 0s ago
 Invocation: 82ece123a2784c97972bfca6f1ded61e
   Main PID: 9884 (vsftpd)
      Tasks: 1 (limit: 23034)
     Memory: 864K (peak: 1.4M)
        CPU: 2ms
     CGroup: /system.slice/vsftpd.service
             └─9884 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf

Jan 15 13:44:53 ivschemelev.localdomain systemd[1]: Starting vsftpd.service - Vsftpd ftp daemon...
Jan 15 13:44:53 ivschemelev.localdomain systemd[1]: Started vsftpd.service - Vsftpd ftp daemon.
root@ivschemelev:/home/ivschemelev#
```


Рис. 4: Служба vsftpd в автозапуске

Анализ зависимостей vsftpd

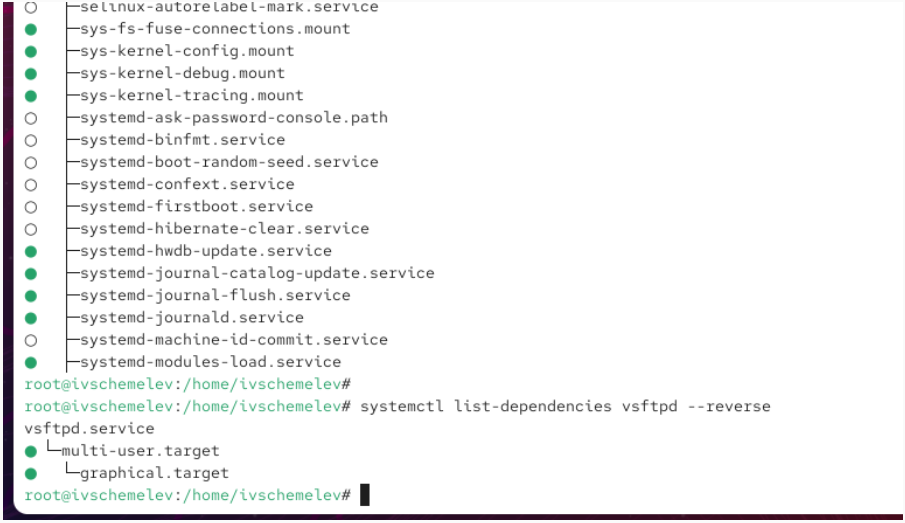

Рис. 5: Зависимости и обратные зависимости vsftpd

Проверка статуса firewalld и iptables

```
Transaction test succeeded.
Running transaction
  Preparing        :                                                                                1/1
  Installing       : iptables-utils-1.8.11-11.el10.x86_64                                           1/3
  Installing       : iptables-nft-services-1.8.11-11.el10.noarch                                    2/3
  Running scriptlet: iptables-nft-services-1.8.11-11.el10.noarch                                    2/3
  Installing       : iptables-devel-1.8.11-11.el10.x86_64                                           3/3
  Running scriptlet: iptables-devel-1.8.11-11.el10.x86_64                                           3/3

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

Complete!
root@ivschemelev:/home/ivschemelev# 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 Thu 2026-01-15 13:29:31 MSK; 20min ago
 Invocation: ce4b723a02454fc3813f707ead31c1cd
       Docs: man:firewalld(1)
   Main PID: 1161 (firewalld)
      Tasks: 2 (limit: 23034)
     Memory: 50.1M (peak: 72.1M)
        CPU: 241ms
     CGroup: /system.slice/firewalld.service
             └─1161 /usr/bin/python3 -sP /usr/sbin/firewalld --nofork --nopid

Jan 15 13:29:31 ivschemelev.localdomain systemd[1]: Starting firewalld.service - firewalld - dynamic firewall daemon...
Jan 15 13:29:31 ivschemelev.localdomain systemd[1]: Started firewalld.service - firewalld - dynamic firewall daemon.
root@ivschemelev:/home/ivschemelev# 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@ivschemelev:/home/ivschemelev#
```

Анализ юнита firewalld

```
root@ivschemelev:/home/ivschemelev#
root@ivschemelev:/home/ivschemelev# systemctl start firewalld.service
root@ivschemelev:/home/ivschemelev# systemctl start iptables
root@ivschemelev:/home/ivschemelev#
root@ivschemelev:/home/ivschemelev# 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
LockPersonality=yes
MemoryDenyWriteExecute=yes
PrivateDevices=yes
ProtectClock=yes
ProtectControlGroups=yes
ProtectHome=yes
```

Анализ юнита iptables

```
root@ivschemelev:/home/ivschemelev#
root@ivschemelev:/home/ivschemelev# 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@ivschemelev:/home/ivschemelev#
```

Рис. 8: Файл iptables.service

Маскирование службы iptables

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

Рис. 9: Маскирование iptables

Поиск изолируемых целей

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

Переход в режим восстановления

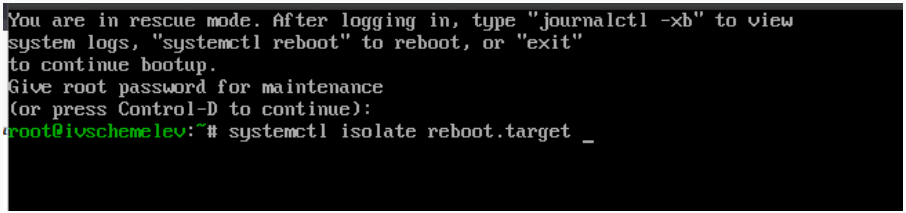

Рис. 11: Режим rescue.target

Установка текстового режима загрузки

```
ivschemelev@ivschemelev:~$ su
Password:
root@ivschemelev:/home/ivschemelev# systemctl get-default
graphical.target
root@ivschemelev:/home/ivschemelev# systemctl set-default
Too few arguments.
root@ivschemelev:/home/ivschemelev# 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@ivschemelev:/home/ivschemelev#
```

Рис. 12: Установка multi-user.target

Возврат графического режима загрузки

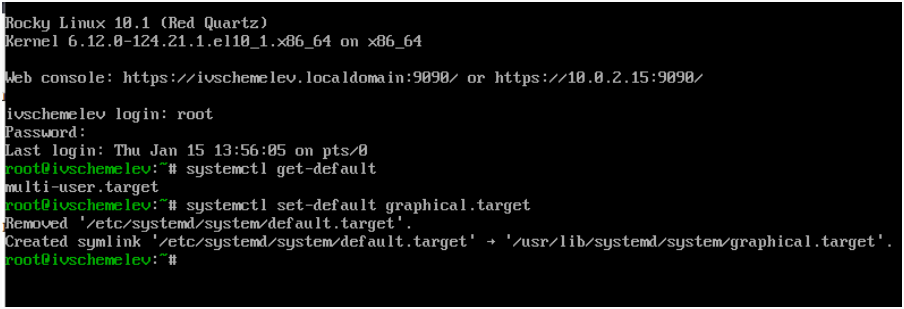

Рис. 13: Установка graphical.target

Итоги работы

Заключение

В ходе лабораторной работы были изучены механизмы управления системными службами и целями systemd. Освоены приёмы установки, запуска, настройки автозапуска сервисов, анализа зависимостей и разрешения конфликтов между службами. Полученные навыки позволяют эффективно управлять режимами работы и состоянием операционной системы.