

Лабораторная работа №5

Управление системными службами

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Цель работы

Основная цель

Получить практические навыки управления системными службами и целями загрузки в операционной системе Linux с использованием менеджера **systemd**.

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Ход выполнения работы

Управление сервисами

```
root@mlabsi:/etc/yum.repos.d# systemctl status vsftpd
Unit vsftpd.service could not be found.

root@mlabsi:/etc/yum.repos.d# dnf -y install vsftpd
Last metadata expiration check: 0:18:09 ago on Fri 12 Dec 2025 07:05:55 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           2.2 MB/s | 170 kB   00:00
 -----
 Total                                         126 kB/s | 170 kB   00:01

 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

 Complete!
```

Рис. 1: Проверка статуса vsftpd

Установка сервиса vsftpd

```
root@mlabsi:/etc/yum.repos.d# systemctl status vsftpd
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Last metadata expiration check: 0:18:09 ago on Fri 12 Dec 2025 07:05:55 PM MSK.
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-----
Total                                         126 kB/s | 170 kB   00:01

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

Complete!
root@mlabsi:/etc/yum.repos.d#
```

Рис. 2: Установка vsftpd

Запуск сервиса vsftpd

```
root@mlabsi:/etc/yum.repos.d# systemctl start vsftpd
root@mlabsi:/etc/yum.repos.d# systemctl status vsftpd
● vsftpd.service - Vsftpd ftp daemon
    Loaded: loaded (/usr/lib/systemd/system/vsftpd.service; disabled; preset: disabled)
    Active: active (running) since Fri 2025-12-12 19:24:35 MSK; 8s ago
      Invocation: 9954ebef190d4056a18f039782f1ec48
        Process: 8111 ExecStart=/usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf (code=exited, status=0/SUCCESS)
      Main PID: 8112 (vsftpd)
         Tasks: 1 (limit: 23140)
        Memory: 852K (peak: 1.2M)
          CPU: 2ms
        CGroup: /system.slice/vsftpd.service
                  └─8112 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf

Dec 12 19:24:35 mlabsi.localdomain systemd[1]: Starting vsftpd.service - Vsftpd ftp daemon...
Dec 12 19:24:35 mlabsi.localdomain systemd[1]: Started vsftpd.service - Vsftpd ftp daemon.
root@mlabsi:/etc/yum.repos.d# █
```

Рис. 3: Запуск и статус vsftpd

Управление автозапуском

```
root@mlabsi:/etc/yum.repos.d# systemctl enable vsftpd
Created symlink '/etc/systemd/system/multi-user.target.wants/vsftpd.service' → '/usr/lib/systemd/system/vsftpd.service'.
root@mlabsi:/etc/yum.repos.d# systemctl status vsftpd
● vsftpd.service - Vsftpd ftp daemon
   Loaded: loaded (/usr/lib/systemd/system/vsftpd.service; enabled; preset: disabled)
   Active: active (running) since Fri 2025-12-12 19:24:35 MSK; 45s ago
     Invocation: 9954ebef190d4056a18f039782f1ec48
    Main PID: 8112 (vsftpd)
      Tasks: 1 (limit: 23140)
     Memory: 852K (peak: 1.2M)
        CPU: 2ms
       CGroup: /system.slice/vsftpd.service
               └─8112 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf

Dec 12 19:24:35 mlabsi.localdomain systemd[1]: Starting vsftpd.service - Vsftpd ftp daemon...
Dec 12 19:24:35 mlabsi.localdomain systemd[1]: Started vsftpd.service - Vsftpd ftp daemon.
root@mlabsi:/etc/yum.repos.d#
root@mlabsi:/etc/yum.repos.d# systemctl disable vsftpd
Removed '/etc/systemd/system/multi-user.target.wants/vsftpd.service'.
root@mlabsi:/etc/yum.repos.d# systemctl status vsftpd
● vsftpd.service - Vsftpd ftp daemon
   Loaded: loaded (/usr/lib/systemd/system/vsftpd.service; disabled; preset: disabled)
   Active: active (running) since Fri 2025-12-12 19:24:35 MSK; 1min 9s ago
     Invocation: 9954ebef190d4056a18f039782f1ec48
    Main PID: 8112 (vsftpd)
      Tasks: 1 (limit: 23140)
     Memory: 852K (peak: 1.2M)
        CPU: 2ms
       CGroup: /system.slice/vsftpd.service
               └─8112 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf

Dec 12 19:24:35 mlabsi.localdomain systemd[1]: Starting vsftpd.service - Vsftpd ftp daemon...
Dec 12 19:24:35 mlabsi.localdomain systemd[1]: Started vsftpd.service - Vsftpd ftp daemon.
root@mlabsi:/etc/yum.repos.d# █
```

Рис. 4: Enable и disable vsftpd

Символические ссылки systemd

```
root@mlabsi:/etc/yum.repos.d# ls /etc/systemd/system/multi-user.target.wants/
atd.service      cups.path          libstoragemgmt.service   remote-fs.target    vboxadd.service
auditd.service   cups.service       mcelog.service       rsyslog.service    vboxadd-service.service
audit-rules.service firewalld.service mdmonitor.service  smartd.service    vmtoolsd.service
avahi-daemon.service httpd.service  ModemManager.service sshd.service
chronyd.service  irqbalance.service NetworkManager.service sssd.service
crond.service    kdump.service     remote-cryptsetup.target tuned.service
root@mlabsi:/etc/yum.repos.d# systemctl enable vsftpd
Created symlink '/etc/systemd/system/multi-user.target.wants/vsftpd.service' → '/usr/lib/systemd/system/vsftpd.service'.
root@mlabsi:/etc/yum.repos.d# ls /etc/systemd/system/multi-user.target.wants/
atd.service      cups.path          libstoragemgmt.service   remote-fs.target    vboxadd.service
auditd.service   cups.service       mcelog.service       rsyslog.service    vboxadd-service.service
audit-rules.service firewalld.service mdmonitor.service  smartd.service    vmtoolsd.service
avahi-daemon.service httpd.service  ModemManager.service sshd.service
chronyd.service  irqbalance.service NetworkManager.service sssd.service
crond.service    kdump.service     remote-cryptsetup.target tuned.service
root@mlabsi:/etc/yum.repos.d# systemctl status vsftpd
● vsftpd.service - Vsftpd ftp daemon
   Loaded: loaded (/usr/lib/systemd/system/vsftpd.service; enabled; preset: disabled)
   Active: active (running) since Fri 2025-12-12 19:24:35 MSK; 2min 9s ago
     Invocation: 9954ebef190d4056a18f039782flec48
      Main PID: 8112 (vsftpd)
        Tasks: 1 (limit: 23140)
       Memory: 852K (peak: 1.2M)
         CPU: 2ms
        CGroup: /system.slice/vsftpd.service
                  └─8112 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf

Dec 12 19:24:35 mlabsi.localdomain systemd[1]: Starting vsftpd.service - Vsftpd ftp daemon...
Dec 12 19:24:35 mlabsi.localdomain systemd[1]: Started vsftpd.service - Vsftpd ftp daemon.
root@mlabsi:/etc/yum.repos.d#
```

Рис. 5: Список сервисов автозапуска

Зависимости сервиса

```
● 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
● systemd-modules-load.service
● systemd-network-generator.service
○ systemd-pcrmachine.service
○ systemd-pcrphase-sysinit.service
root@mlabsi:/etc/yum.repos.d#
root@mlabsi:/etc/yum.repos.d# systemctl list-dependencies vsftpd --reverse
vsftpd.service
● └─multi-user.target
●   └─graphical.target
root@mlabsi:/etc/yum.repos.d#
```

Рис. 6: Зависимости vsftpd

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@mlabsi:/etc/yum.repos.d#
root@mlabsi:/etc/yum.repos.d# systemctl status firewalld
● firewalld.service - firewalld - dynamic firewall daemon
   Loaded: loaded (/usr/lib/systemd/system/firewalld.service; enabled; preset: enabled)
   Active: active (running) since Fri 2025-12-12 19:00:43 MSK; 28min ago
     Invocation: 021dfd22a5664abfb1eacf7e96f1583
       Docs: man:firewalld(1)
      Main PID: 1137 (firewalld)
        Tasks: 2 (limit: 23140)
       Memory: 50.5M (peak: 71.9M)
         CPU: 565ms
        CGroup: /system.slice/firewalld.service
                  └─1137 /usr/bin/python3 -sP /usr/sbin/firewalld --nofork --nopid

Dec 12 19:00:40 mlabsi.localdomain systemd[1]: Starting firewalld.service - firewalld - dynamic firewall daemon...
Dec 12 19:00:43 mlabsi.localdomain systemd[1]: Started firewalld.service - firewalld - dynamic firewall daemon.
root@mlabsi:/etc/yum.repos.d# systemctl status iptables
○ iptables.service - IPv4 firewall with iptables
   Loaded: loaded (/usr/lib/systemd/system/iptables.service; disabled; preset: disabled)
   Active: inactive (dead)
root@mlabsi:/etc/yum.repos.d# systemctl start firewalld
root@mlabsi:/etc/yum.repos.d# systemctl start iptables
root@mlabsi:/etc/yum.repos.d#
```

Рис. 7: Статус firewalld и iptables

Конфигурация firewalld

```
root@mlabsi:/etc/yum.repos.d# 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
```

Рис. 8: Файл firewalld.service

Конфигурация iptables

```
root@mlabsi:/etc/yum.repos.d#  
root@mlabsi:/etc/yum.repos.d# 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=CONSOLETYP=serial  
  
[Install]  
WantedBy=multi-user.target  
root@mlabsi:/etc/yum.repos.d#
```

Рис. 9: Файл iptables.service

Маскирование iptables

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

Рис. 10: Маскирование iptables

Просмотр изолируемых целей

```
root@mlabsi:/etc/yum.repos.d# cd /usr/lib/systemd/system
root@mlabsi:/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@mlabsi:/usr/lib/systemd/system#
```

Режим восстановления

```
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@mlabsi:~# systemctl isolate reboot.target
```

Рис. 12: Rescue mode

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

Рис. 13: multi-user.target

Графический режим

```
Rocky Linux 8.0 (Red Quartz)
Kernel 6.12.0-55.39.1.el8_0.x86_64 on x86_64

Web console: https://mlabsi.localdomain:9090/ or https://10.0.2.15:9090/
(mlabsi login: root
Password:
Last login: Fri Dec 12 19:37:12 on pts/0
root@mlabsi:~# systemctl get-default
multi-user.target
root@mlabsi:~# 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@mlabsi:~#
```

Рис. 14: graphical.target

Заключение

В ходе лабораторной работы были изучены механизмы управления сервисами и целями в системе **systemd**. Освоены навыки установки, запуска, добавления в автозапуск, анализа зависимостей и разрешения конфликтов юнитов. Полученные знания позволяют эффективно администрировать службы и управлять процессом загрузки Linux-систем.